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QUALITY AND USES OF FEDERAL INFORMATION

HEARING

BEFORE THE

SUBCOMMITTEE ON GOVERNMENT INFORMATION AND REGULATION

OF THE

COMMITTEE ON GOVERNMENTAL AFFAIRS UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

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QUALITY AND USES OF FEDERAL INFORMATION

MONDAY, MAY 15, 1989

U.S. SENATE,
SUBCOMMITTEE ON GOVERNMENT INFORMATION
AND REGULATION,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:33 a.m., in room SD-342, Dirksen Senate Office Building, Hon. Jeff Bingaman, Chairman of the Subcommittee, presiding.

Present: Senator Bingaman.

Staff present: Edwin S. Jayne, Staff Director; Steven L. Katz, Chief Counsel; Kenan P. Jarboe, Professional Staff Member; Rich Ashooh, Minority Professional Staff Member; and Carole Hardwick-Schneier, Chief Clerk.

OPENING STATEMENT OF SENATOR BINGAMAN

Senator BINGAMAN. We'll start the hearing.

I want to welcome everybody today and indicate that this is the second hearing of this newly created Subcommittee on Government Information and Regulation. The Subcommittee has jurisdiction over a wide variety of Government information issues, many of which need serious attention. We look forward to having a constructive role in debating and shaping the direction of information policy.

Today we will focus on the quality and uses of the Federal information infrastructure, particularly with respect to the collection of economic, technological and scientific information. The testimony will focus on the importance of Government information for citizens, for Government, for the private sector, for research and education and for policy making. We will touch on the impact of rapidly changing technology on information collection, maintenance, use and dissemination.

We will also try to identify some of the unmet information needs and underutilized collection capabilities.

There are two major concerns that I want to explore here. First is our information system well managed and well designed. And second, does that system ask the right questions to give us answers about the crucial public policy issues that we will face in the coming years.

The Congress, I believe, has an important responsibility to help define the national interest in information policy and, where neces-

sary, to address the implementation concerns. It is a role that requires an honest assessment of the quality and uses of Federal information and a dialogue between Congress, the executive branch and members of the public.

I hope this Subcommittee can play a constructive role in participating in that dialogue. There is no shortage of directions in which to advance the issues before us today. Many observers define an improved information policy as one which strengthens the guidance governing information collection, analysis and dissemination as well as the management of electronic information systems.

Additionally, questions include whether the information collection by Government is keeping pace with the problems that Federal agencies are trying to solve.

For example, is the Nation's trade policy based on the most useful data? Is enforcement of the Superfund law being delayed because of needed improvements to the data collection or monitoring requirements concerning hazardous and toxic materials? Is the accuracy of our economic forecasting hampered because the foreign-language professional journals are either ignored or not understood?

Our Nation's ability to compete and assume the lead in critical technologies is also reliant on accurate and timely information. Can business practices in collecting information from foreign competitors lend insights for Government, and are our current Government policies based on the right concerns?

I think this will be a very useful first hearing on information policy by this Subcommittee. We had one other hearing on the census, but this is the first time we are going to try to look more at the quality and adequacy of the ongoing information collection effort that exists in our Federal Government.

[Senator Bingaman's prepared statement follows:]

PREPARED STATEMENT OF SENATOR BINGAMAN

I would like to welcome you here today. This is just the second hearing of the newly created Government Information and Regulation Subcommittee. This Subcommittee has important jurisdiction over a wide variety of government information issues, many of which need serious attention. We look forward to our role in debating and shaping the new directions of information policy.

Today we will focus on the quality and uses of the federal information infrastructure, particularly with respect to the collection of economic, technological, and scientific information. The testimony will focus on the importance of government information for citizens, for government, for the private sector, for research and education, and for policy making. We will touch on the impact of rapidly changing technology on information collection, maintenance, use and dissemination. We will also try to identify unmet information needs and underutilized collections capabilities, as well.

Simply put, I have two concerns. First, is our information system well managed. And, second does that system ask the right question to get the right answers about our crucial public policy issues. The Congress, I believe has an important responsibility to define the national interest in information policy, and where necessary, to address related implementation concerns.

It is a role which requires an honest assessment of the quality and uses of Federal information, and a vigorous dialogue between Congress, the Executive Branch, and members of the public. As a new subcommittee, we cannot take credit for beginning this dialogue, for it is well underway. However, we are committed to serving as an important forum for debate, evaluation, and reform.

There is no shortage of directions in which to advance the issues before us today. Many observers define an improved information policy as one which strengthens

the guidance governing information collection, analysis, and dissemination, as well as the management of electronic information systems. Additional questions include whether the information collected by government is keeping pace with the problems federal agencies are trying to solve. For example, is our nation's trade policy based on the most useful data? Is enforcement of the Superfund law being delayed because of needed improvements to the data collection or monitoring requirements concerning hazardous and toxic materials in local? Is the accuracy of our economic forecasting hampered because foreign language professional journals are either ignored or not understood?

There is also the question as to how best to utilize the information the Federal government does collect. How can we ensure that information is accessible and in a form which can be assimilated into the world around us? The collection and assimilation of information pertaining to the economy, to education, science, health, and technology deserves particularly important attention.

The information age has made the world a smaller place. More information is available, but it has created new demands for timeliness and accuracy. Technological advances are creating new opportunities for improving Federal information collection, use, and dissemination. However, it is essential to be equally aware of the parallel risks to privacy and security. To realize the promise offered by new information technologies will require top level attention within agencies to information resources management, from planning, to implementation, to evaluation.

How does our government respond to the changing environment? Have we been moving in the right direction? In the statistical area there are serious concerns. The United States has been cutting back its federal statistical system just when it needs it the most. Global economic preeminence, health care, and education are just a few of the areas requiring a strong statistical base. However, during the 1980s the statistical work of the federal government has been viewed as costly and burdensome by many top officials. Many statistical agencies and activities have suffered cuts in the name of "burden" to government without considering the "benefit" of information in policymaking and to the public.

Even those who argue that statistical agencies and information functions of federal agencies are not underfunded, have stressed the need to improve government data. As we in Congress work to maintain the highest standard of living for all Americans, I cannot help but worry whether our economic data is accurate. That shifts the concern over the inadequacy of statistics from the academic world to the bank account of the Federal Reserve and the average American.

Our nation's ability to compete and assume the lead in critical technologies is also reliant on accurate and timely information. An important part of assessing the quality and uses of Federal information includes the area of science and technology. What are the obstacles to fuller U.S. participation in the world of scientific communication? Can business practices in collecting information from foreign competitors lend insights for government? Are our current government policies based on the right concerns? Has ideology driven us in the wrong direction? Where are the advances in such areas as "superconductivity" coming from? What is the path to innovation and production? How quickly can U.S. industry adapt to changes which we know must be implemented to avoid foreseeable decline?

The future of the information age is the future of our society. While putting a human face on the issue of Federal information policy is often difficult, it is essential to achieving the highest levels of government effectiveness. As one philosopher has said, "Training is preparing against surprise. Education is preparing for surprise." It is my hope that by better understanding the quality and uses of Federal information, our government will be educated for the surprises that the future always brings.

Senator BINGAMAN. Let me just introduce into the record a statement that Senator Tom Daschle has prepared on information policy that he would like to have made part of our record as well.[1]

We are very pleased today that Michael Boskin, who is, of course, the head of the Council of Economic Advisers for the new administration, is our witness. He has spoken out very forcefully on this set of issues and has taken the initiative since he has come to Washington with this administration to begin to address some of the real needs that exist here.

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[1] See p. 73.

We are very pleased to have you. I know you have just come in from a trip to Europe, and we look forward to your testimony. Then after any comments that you would like to make, I would have some questions to ask you.

TESTIMONY OF MICHAEL BOSKIN, Ph.D., CHAIRMAN, COUNCIL OF ECONOMIC ADVISERS

Dr. BOSKIN. Thank you, Senator Bingaman.

It is a pleasure to be here. Let me congratulate your Subcommittee for delving into what I consider to be a very important subject.

Let me start by saying that all Americans have an important stake in the quality of statistical information whether generated privately or publicly. Much of our economic database comes from various Federal Government statistics, generated by various Federal Government agencies. And not only do the policy makers in Congress, the executive branch and the Federal Reserve rely on these statistics for input into their policy-making decisions, but it is also the case that virtually all business firms, all workers, all consumers, all families react to, respond to and need these data in a wide-ranging set of their own basic decision makings from indexing of contracts to their own fundamental decisions about saving and investing and working and things of that sort.

Let me just try to do two things: One is to explain sort of generically the concern that I previously as an economic researcher and currently as Chairman of the Council of Economic Advisers have in this area, and then talk a little bit about the beginnings of the work that we in the Administration are doing now to begin to try to deal with some of these issues.

Concern about the quality of economic statistics has been expressed by the Congress, the Committee on Statistics for the American Economic Association, the National Association of Business Economists, the National Academy of Sciences and others.

Many of these concerns, I might say, date back into at least the early 1970's. They stem from a variety of sources, including the fact that so much has changed in the economy, as well as various basic statistical issues, which I will return to in a moment.

In addition to this Subcommittee's efforts, the Joint Economic Committee has held hearings on improving the quality of Government statistics some time ago—I think it was 1986—and may hold further hearings this year, as they have indicated.

The press has highlighted problems with many of our economic statistics, concerns with them about their inclusiveness and their accuracy and so on, as well as the attempts being made to update, extend and improve them.

Highlighted recently, as you have indicated yourself, sir, are the trade data. And I might add to that, service sector productivity, measures of national saving, investment and wealth, and a variety of other economic statistics.

The Federal statistical agencies have been and continue to work hard on improving our statistical infrastructure database. They have been working on these and other problems and have achieved several impressive improvements. For example, revisions to the national income and product accounts have taken into account vari-

ous methodological improvements in measuring price data for producers' durable equipment, particularly computer prices, which have led to some rather substantial revisions in our GNP accounts.

The Bureau of Labor Statistics and the Census have worked together in improving the trade estimates, for example, in getting real trade flows as opposed just to nominal trade flows.

We must remember, though, that the resources of the statistical agencies are constrained and measurement in an economy with a large and growing service sector and a large and growing international sector is perhaps becoming more difficult, for reasons beyond the control of these statistical agencies.

Both as the Chairman of the Council of Economic Advisers and previously as an economic researcher, I have had a major interest in the quality of the Federal economic statistics. To remind you, sir, the Council of Economic Advisers has the duty of receiving and communicating the major economic statistics to the President prior to the official release. The Council of Economic Advisers is responsible, along with the Joint Economic Committee, for publishing Economic Indicators, a compendium of the most important economic statistics which we provide monthly to the Congress for Congress' use.

The Council of Economic Advisers also has the responsibility, subject to the Employment Act of 1946 and the Full Employment and Balanced Growth Act of 1978, of monitoring trends in the economy to aid the President in his decisions on a wide range of economic issues. Much of our advice is ultimately based on Government statistical data, both directly and indirectly, as we apply the lessons of empirical research done by the broad economics community.

While good, better, and more accurate information may not assure sound decisions in all cases, surely poor information clearly can only lead to good decision making by accident. The Council of Economic Advisers is thus also concerned with economic data, as highlighted in a number of the policy issues related to these statistics in past Economic Reports of the President.

The first step in addressing the shortcoming of the Federal statistical system is to agree at the highest levels to focus attention and energies on these problems. We have begun to do that. The President shares the Council of Economic Advisers' views on the importance of the economic statistics and, in his February 9th address, affirmed the importance of expanding our knowledge base by improving the accuracy and quality of our statistics.

More specifically, the Administration has established within the Economic Policy Council a working group on improving the quality of the Government's economic statistics. The Economic Policy Council has been charged with developing a strategy for improving the Federal Government's economic statistics. To this end it will prepare a report identifying deficiencies in current economic statistics, developing priority areas for improvement and suggesting means for making these improvements.

In my role as Chairman of the Council of Economic Advisers I will chair the working group and lead the preparation of the report.

The working group's report will review all previous major studies on this subject by the private and public sectors and will include, first, an inventory and catalogue of existing data issues and problems as well as a review of the statistical agencies' current and planned efforts in these areas; second, an evaluation of existing public and private data series and possible additions or deletions; and third, a recommendation of a coordinated effort to focus resources on the highest-priority statistical problems.

I am particularly interested both in reaffirming the Administration's commitment to better statistics and in implementing actions in the intermediate run over the next short period of time, 2 or 3 or 4 years, that will improve the quality of the statistics that are most important from an economic policy perspective, from the Congress' perspective, from the executive branch's perspective, the Federal Reserve's perspective and so on.

Examples of these include international trade figures in general, service sector productivity, aggregate saving and investment, and the net foreign asset position of the United States.

Given the likelihood of tight Federal budget constraints for the next several years, the desire to get something done implies a focus on methodological and other improvements that can be accomplished with reallocations of funds and personnel on a modest basis.

I would also anticipate that the Economic Policy Council report will address longer-run issues of structure and support and desirable new initiatives. But the main focus of the report will be on intermediate-run improvements, not necessarily on the hypothetically ideal Federal statistical program.

We have only had our initial meeting of the working group, so it is much too early to predict its recommendations. On the other hand, it is not too late for you, Senator, and your Subcommittee to effect those recommendations and to interact with our working group.

I have asked a variety of groups within and without the Government in the executive and legislative branch and the private sector to submit suggestions of priority projects. And I extend that same invitation to you today. I would hope that that could be done with the assistance of your staff after the conclusion of these hearings, with some dispatch. While you may list anything you like, I would suggest that anything that promises inexpensive improvements in basic important data in an intermediate time frame of 2 to 4 years is most likely to coincide with the thrust the Committee and the working group are likely to be pushing.

Thank you again for giving me the chance to speak to you. I will be happy to attempt to answer any questions you may have, Senator, and once again we stand ready, willing and desirous of working together with the Congress in trying, in the midst of the rapid changes in the structure of our economy and the demands placed on our statistical agencies and our statistical systems, to work with you in improving and updating them and making them even more useful to policy makers and the public alike.

Thank you very much.

Senator BINGAMAN. Thank you. I want to start, of course, by complimenting you on taking the initiative to deal with some of

these problems that have been recognized for a long while, and heading this working group.

When is the report of the working group that you referred to expected?

Dr. BOSKIN. The initial report will be July 31. That is designed to sort of lay out the results of the preliminary inquiry, the cataloguing of existing efforts across all the different agencies and so on and to make some generic recommendations. There will obviously be a follow-up effort to that.

Senator BINGAMAN. As I understand it, the report will primarily focus on the actions that you see that can be taken in the short term to effect the economic statistics and information that we obtain for decision making in the next 2 to 4 years. Is that accurate or not?

Dr. BOSKIN. Well, yes. Let me phrase that—that's accurate, but if I may phrase it slightly differently, sir—I think what we want to do is to make sure that we get in place some sense of the priorities and try to implement them—various aspects of improving the accuracy and usefulness of the economic statistics that can have some payoff over the next several years.

For example, the Bureau of Economic Analysis in the Commerce Department, which has made some major steps in improving the national income accounts, has a 10-year project on improving service sector data. We think that is all well and good, but we wouldn't want this working group just to say here are the problems, they are all important and 10 or 15 years from now we should have a better statistical system. We believe that we also need to make some headway on a shorter time frame than that without derailing the important initiatives that may be on a longer-term time frame.

Senator BINGAMAN. To get down to some of the specifics that you referred to, trade data is one area that you made some statements indicating cause for your concern there.

Could you elaborate on that? I gather that the whole issue of our trade deficit and the trade data and the amount of information we are collecting there has changed dramatically in the last several years. Could you describe in a little more detail what you see as the needs and the problems there?

Dr. BOSKIN. Well, a couple of things, Senator. First let me just say that because we are running a very large trade deficit and have been running one persistently for the last several years for the first time in a very long time, obviously a great deal of attention is focused on the trade statistics from the financial markets to the policy-making community and to the public.

The trade statistics had not been the highest priority of our statistical agencies until quite recently. We had not paid a lot of attention to improving our measure of import and export prices so that we could get our trade data reported in real terms just like we report real GNP. We had had some different valuation methods being used for services and for goods.

We have different sampling arrangements, now that investment, international investment in the United States, has become an issue for better or for worse; there are issues about whether we can and should make more extensive or different types of informational re-

quests in the Commerce Department's data base with respect to that.

We also have a variety of related issues of international comparability, not just in measuring our own trade. We had a situation, just as one example, a couple of years ago where the Canadians said we exported many billions of dollars more than our data showed we exported to them. And we worked it out, and eventually it appeared that they were right.

But also, there are issues of international comparability: we measure things in some ways, other countries measure things in others. So it's important, in a world where we are focusing on international comparisons and on the international trade sector, that we do everything we can to be more accurate.

One example is when one is examining the international asset position of the United States, a subject that has gotten much national attention lately, it is useful to note, in addition to the traditional data, that American assets abroad were acquired somewhat earlier than the more recent flux of or flow of foreign assets in the United States. So if one adjusted them as we do many other things in our accounts to their replacement costs our international asset position would look very different than if it is placed on an historic cost basis.

Many years ago, the Commerce Department had a long, detailed study to do that for our own domestic investment in capital goods—to place those on a replacement cost basis. So there are a variety of inflation adjustments, historical cost versus replacement cost, a variety of accounting issues, in addition to just the flow of statistical information.

Senator BINGAMAN. But you would expect that as a result of your working group's efforts, there will be some significant changes made in the way we collect and report trade data?

Dr. BOSKIN. I wouldn't go that far, sir. I think that what there will be, will be a series of recommendations based on our best advice and consultation. And those may or may not go further than those that are already planned by the Commerce Department or the Bureau of Labor Statistics.

It is just my own personal belief, and again I chair a working group and the working group has representatives from all the producing and using agencies as well as from the Federal Reserve assisting, that it is important that we not prejudge that, but I do believe that it is possible that some suggestions for more accurate data will come about.

Senator BINGAMAN. There has also been some criticism that not only do we have some problems with the data, but we don't actually prepare it and release it in a timely manner, that it takes us about 6 weeks to get a report out, whereas the Japanese get theirs out in 2 weeks.

Is that a valid criticism, in your view? Is there a way to speed this process, or does it really matter?

Dr. BOSKIN. Well, first of all, there are always private forecasters willing to fill any void of that sort. And so we can always get a private forecast prior to the Government forecast of the trade data coming out. As a matter of fact, it's that way for virtually all important Government economic statistics.

But it is certainly true that many monthly data we get the following month and the trade data we get, as you have indicated, about 6 weeks later. So often the monthly trade numbers are a month behind the data we have from other sources.

But I think that the ability to collect that data and collect it accurately has generically some difficulties that will take longer than, for example, the sampling of domestic prices and things of that sort that comparable agencies put out.

So I wouldn't want to go so far as to say that the time frame is necessarily an urgent problem. Perhaps we can speed things up a little bit, but I am as concerned with making sure the data are as accurate as possible as I am with getting them on a timely basis. Obviously we want them on a timely basis, but I would hate to sacrifice accuracy to speed that up by a few days.

Senator BINGAMAN. What about productivity statistics? When we had the confirmation hearing for Richard Darman here in this room, he indicated his strong-held belief that the greatest challenge we face as a country is how we improve productivity.

Dr. BOSKIN. I strongly share that view.

Senator BINGAMAN. I was reading over a report that an MIT commission on productivity did. In it they go through a description of how, in general, productivity in this country has not increased as quickly as it has in other countries. However, one bright spot has been the surge in improved productivity in the manufacturing sector during the 1980's.

They go on to say that the Department of Commerce has indicated that there may be problems in the way they measured increases in productivity and manufacturing and we're not sure how valid the statistics that indicate this significant surge in productivity increase.

So is there a major problem in the way we keep track of productivity improvements as well? Is that something that your task force can deal with or your working group?

Dr. BOSKIN. Yes. Productivity, as you indicated, is perhaps the major long-term economic issue confronting the country. It is the foundation upon which increases in the standards of living of Americans in the future will occur.

I think it is fair to say from the measured statistics that while the United States has the highest productivity of any advanced economy, some other countries have had more rapid productivity growth from a lower base than we have had of late.

In the 1950's and 1960's, from the conventional data, we had very rapid productivity growth. We had almost no productivity growth in the 1970's, and we have rebounded, roughly speaking, halfway from that rather dismal performance in the 1970's.

The spearhead of that productivity growth rebound, as you have mentioned, is in manufacturing. I personally believe that whatever problems there are in measuring productivity data in manufacturing are dwarfed by the problems of measuring productivity in services. The service sector is a very large sector of our economy. It includes a variety of things for which, even at the most conceptual level, it is very difficult to measure, like output. Productivity is defined as output per unit of input; for example, labor productivity, how much is produced per worker hour or per person-year of work.

In that context, when you are dealing with things like tons of steel, it is a little easier to measure output than when you are dealing with some service sector data. For example, if you're dealing with computer software, counting computer programs is not a very effective way of measuring output.

If you're dealing with the medical sector, which is a large and growing and very important part of our economy, the question of quality change comes up. We certainly have been increasing life expectancy and so on. With all the increased technology and so on, are we providing a different product when our citizens go to their office visits or the hospital than we used to provide?

And trying to get improved productivity data in those kinds of sectors I think is probably where the biggest questions arise. Also, for new products, we do a survey of new products every 6 years and we rotate every 6 years, but as you indicated, we have a rapidly changing technological society and the life of some products is under 6 years. You could have a product appear and disappear and we would never manage to have gotten it in our product survey. Every 6 years we have a new product survey for our price data.

So these are all important issues. I personally do think we have had a major and impressive rebounding in productivity in the manufacturing sector, and the problems in measuring output in the service sector are much harder.

In my own industry, education, from which I came, I would like to think that we are producing better-quality education at our universities, including Stanford, than the previous generation of teachers and students produced, but it is awfully difficult to measure productivity in that regard other than just by counting the number of students.

Senator BINGAMAN. There is a newsletter that the Council on Competitiveness puts out. They have a report in there entitled "Manufacturing Comeback Disputed," in it they refer to a study that Laurence Michel, with the Washington Economic Policy Institute, has done where he says that labor productivity growth between 1979 and 1985 was one-third less than reported.

Are you familiar with this? Is this something that you are planning to look into?

Dr. BOSKIN. We are planning to look into it. I personally, sir, am not familiar with the study, although I have heard of it and my staff is looking into it. And we would be happy to get back to you when we have an evaluation of it.

Senator BINGAMAN. Yes, I would be anxious to hear of your findings.

I would like to ask another question about the working group. Who are it's members? Is it the Cabinet heads? Is it the heads of statistical agencies? Who is on this working group?

Dr. BOSKIN. The working group consists of representatives from each of the important departments that generate statistics and use statistics. So, for example, it will include from the Commerce Department in the working group the Undersecretary of Commerce for Economic Affairs, who is in charge of the Census Bureau and the Bureau of Economic Analysis, which does the national income and product accounts and a variety of things of that sort and so on.

So it is a high-ranking person at the assistant or undersecretary level from each of the Cabinet agencies. It includes a mixture of such people. And, for example, Janet Norwood, who is Commissioner of Labor Statistics, from the Labor Department.

What we are trying to do is have both the people from the statistical agencies and either the principals or the representative of the principals from the Cabinet secretaries, let us say, actively represented so that we can have both those levels, so that we can have both the informational input, the expertise and the desires of statistical agencies represented in the working group as well as the plans and constraints and desires of the people who are in charge of them, in a sense.

Senator BINGAMAN. How many additional meetings, roughly, do you think you can have? I am concerned that it may be difficult to hold enough meetings in June to enable you to put out a report on July 31. Can you give me an idea of how extensive the working group's interaction will be?

Dr. BOSKIN. It is going to be quite extensive. People right now are in the process of preparing reports for the next meeting, which will be in a couple of weeks. And we probably will meet at least one or two other times at 1-to-2-week spans, and then we will try to, in July, draft the report for the EPC.

I will remind you, Senator Bingaman, that this is designed to sort of give an overview to the EPC of what the issues are, what the problems are, what the opportunities are and where we might go, and present some options, and then the Economic Policy Council will decide at that stage what further action to take.

So this is not by any stretch of the imagination meant to be a final report.

Senator BINGAMAN. Is the Federal Reserve represented on your working group?

Dr. BOSKIN. Not formally, but they are invited to attend and do send a representative. Obviously the Federal Reserve both is an important producer of these data; for example, they produce the data on industrial production and capacity utilization and our national balance sheets and flow of funds, and they are as well an important user of them in their own decision making.

Senator BINGAMAN. I have read some criticisms about the plant utilization statistics that they keep, indicating that they are woefully outdated and inaccurate. Do you have any views about that? Is that an issue that your working group is going to try to address—what can you tell us?

Dr. BOSKIN. We are certainly reviewing all the major statistics, including those. I think that the recent discussion in the media about these data revolved around three issues:

One is that the capacity utilization data are taken from information requested of a not totally random sample of firms which may be multiplant, multiproduct, multinational firms in some cases. And so if you are the person answering the questionnaire for such a firm and asked what fraction of your capacity you're using, it's a little difficult to figure that out because you may have, to take an extreme, 100 percent of your plants operating at 85 percent of capacity, which may be very different from having 85 percent of your

plants operating at 100 percent of capacity or near 100 percent of capacity.

So there are a variety of concerns about how useful the capacity utilization numbers are today relative to what they were previously.

The second concern, given we live in such an international economy today that any given level of capacity utilization may have a different interpretation in its impact on inflationary pressures, depending on what capacity utilization is in the rest of the world, for example.

But I think the Federal Reserve does a good job in its data collection and dissemination, and we are just going to be looking at all the statistics. I wouldn't want to prejudge whether we would make any recommendations that deal with their particular data or that we would prejudge anything they have of their own statistical apparatus and our updating and extending and elaborating their data.

Chairman Greenspan, I am sure you know, is somebody who pays very careful attention to these data and is an expert on them. And he has the Federal Reserve hard at work in trying to improve the data that they collect and generate and disseminate. It's an important concern of his as well.

Senator BINGAMAN. Some of the testimony we are going to receive later in the morning from one of our witnesses, Dr. Courtenay Slater, indicates that industry classification definitions were last updated in 1972. Is that consistent with your understanding of things?

Dr. BOSKIN. Yes. It is my understanding, although let me repeat that we are at the next meeting of this working group going to be receiving a report on the current status of the plans for improving and updating the statistics, which will go into that in some detail. It is my understanding that the Bureau of Economic Analysis of the Commerce Department has as a high priority the improved industry-level data.

So I think that they are aware of this issue and are in the process of at least in the early stages of trying to do something about it. It may be that if in the collective judgment of this working group and its interaction with the Congress and private people and so on, we conclude that this is a very high priority, it may well be that we would recommend that that be put on a faster track and something else on a slower track. We will just have to see.

Senator BINGAMAN. Another specific that I would like to get any reaction on, there is an OTA article in this recent issue of Technology Review, where they talk about the input-output tables and say there, "Unfortunately, U.S. Government tables are woefully out of date. Those now in use, published in 1984, are based on information collected by the Census Bureau in 1977."

Is that accurate, as far as you know?

Dr. BOSKIN. That's correct. These are updated periodically. They are generally updated, I think it is, about every half dozen years or so. So I think there is—I can't say for certain—but I think there are undoubtedly plans afoot for a new one which will be based on data from the 1980's.

Senator BINGAMAN. Good.

You referred in some of your earlier comments to the problem of getting some reasonable assessment of foreign investment. As far as I can tell, we really don't have any systematic way of calculating or keeping track of foreign investment in the country. Is that correct?

Dr. BOSKIN. Well, I think we do. I think the Commerce Department has various census and survey methods by which it does that in terms of foreign direct investment as well as U.S. direct investment abroad. And we certainly have rather obvious accounting ways to deal with net foreign investment from basic accounting identities. So I think we have a pretty good statement about what the flows are.

My remarks were addressed to inflation-adjusting or market-value accounting for assets, primarily U.S. assets abroad, that were primarily generated in the 1950's and 1960's and may show up in the books as quite undervalued because they are not carried at replacement cost or at market value.

Senator BINGAMAN. But you don't see that as a major need that is going unfilled at this time; that is, the additional collection of information on the extent of foreign investment in different sectors of the economy? You don't see that as a major area that is going to require attention?

Dr. BOSKIN. I think that there is an ongoing procedure for doing that. I think there actually is a review of one of the survey documents that is done that has been going on for the last several weeks with a view towards improving its timeliness and accuracy.

But I think the Commerce Department already has a systematic set of procedures to measure foreign direct investment and direct investment abroad by Americans.

Senator BINGAMAN. As far as your working group's long-term future is concerned, once you issue your report on the 31st of July, you indicated there will then be a follow-up report. Do you have a general idea as to when that would occur and whether this working group would extend into the next year? Does it have a finite life, or does it take on major new jobs once this one is done?

Dr. BOSKIN. Well, that will depend on the wisdom of the Economic Policy Council and, if necessary, the President.

Right now, we are going to prepare this report with an idea of some options of where we go from here. That is the nature of the report; it will be sort of recommendations of various options to the Economic Policy Council. And when the Economic Policy Council receives that report, it will discuss and debate it and decide what would be the most useful thing for this working group or any other implementation of the suggestions to be.

I would imagine that this would be an ongoing issue not only for the Economic Policy Council and this working group, but also at obviously remains an ongoing issue for all the Government statistical agencies.

Senator BINGAMAN. Will the report that is to be done on the 31st of July, be a public report or is that just a report to the Cabinet, and to the Economic Policy Council?

Dr. BOSKIN. It is an internal Cabinet-level report to the Economic Policy Council. It is not a public document.

Senator BINGAMAN. So it would not be public.

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When do you think something would be issued that would be public?

Dr. BOSKIN. Hopefully, not before——

Senator BINGAMAN. Pardon me?

Dr. BOSKIN. I would very much hope that this document is not published. Having come to Washington, I have noted that on occasion things that are internal documents get published even before they are generated.

Let me just say that it is our hope that we will be able to take the decision making of the Economic Policy Council and move to implementation and at sometime thereafter in congressional testimony share some of the decision making and some of the priority items with this Committee and or the full Joint Economic Committee or whatever it happens to be.

I don't expect a written published report. I expect sort of—I expect the report to document and support a series of options in improving the accuracy and timeliness and usefulness of statistics.

Senator BINGAMAN. Well, again, thank you for taking your time to brief us on your activities, and I compliment you for moving ahead on these issues. I do hope that once you get to the point that you can make some of your actions and recommendations public, you will come talk to us again. I think it would be very useful for us to hear about that here in the Subcommittee.

Dr. BOSKIN. Well, I would be delighted to come back at that time. And as I indicated earlier, Senator, we are very anxious to receive input from everybody who is concerned about this. So if you or your staff have any particular concerns or particular desires, if you would make sure they are communicated to me, I would be very happy to receive them.

Senator BINGAMAN. Thank you very much.

Dr. BOSKIN. Thank you, Senator.

Senator BINGAMAN. Next we have a panel made up of Mr. Vincent Barabba, the executive director of market research and planning for General Motors; and Dr. Robert Park, with the American Physical Society.

I would like to go through a little bit of background about your position. As I understand it, you are the executive director of market research and planning at General Motors. You served as director of the Bureau of the Census from 1973 to 1976 and again from 1979 to 1981. You have also worked with Eastman-Kodak and Xerox, and you are now president-elect of the American Statistical Association.

Is that all accurate?

Mr. BARABBA. Yes, sir.

Senator BINGAMAN. We are very pleased to have you here. Thank you.

TESTIMONY OF VINCENT P. BARABBA, EXECUTIVE DIRECTOR OF MARKET RESEARCH AND PLANNING, GENERAL MOTORS CORP.[1]

Mr. BARABBA. I am pleased to be here.

[1] See p. 39 for Mr. Barabba's prepared statement.

Mr. Chairman, I am going to give a brief version of the testimony I submitted earlier.

I think as you have recognized in other statements you have made, we live in an era in which the allowable margin for error in both public and private decision making is narrower than ever before. And recognition of this more narrow allowable margin of error should cause us to take a closer look at the role of information in the decision-making process.

Based on my experience, it is my belief that Government should play an important role in helping public and private policy makers create and use an information base for this country that will allow them to better understand and thus help society adjust to the transformation that is taking place as we move to a global economy.

This morning I will discuss one of the ways Government can help. Quite simply, I believe Government should take a leadership role in reviewing how changing conditions may require us to alter the manner in which we determine our information needs as well as how we collect, analyze and present relevant information.

To set the stage for this discussion, in my written testimony I refer to an incident that took place during World War II, which I believe illustrated quite clearly how different perspectives or frames of reference affect the manner in which we see and use information.

I also point out that this form of human behavior is not a recent phenomenon by recalling in Plato's Republic the allegory about a cave in which the acquisition of human knowledge is likened to shadows and reflections seen on cave walls. People and objects passing outside the cave may have different appearances because of the way the light shines into the cave at any given point in time. For people sitting inside the close walls of the cave, it would be naive to interpret the shadows they see as true reflections of the real world.

Today, in my mind at least, that message is still relevant, particularly for people sitting inside the halls of Government or board rooms across America.

While we strive to move closer to reality, our knowledge is based on our understanding of the images or reflections we see, but the systems that we rely on today, systems that support decision making, like the cave images, can provide no more than a reflection of reality.

Indeed, that leads to another question that needs to be addressed, and how good is the reflection of reality that is provided by the information systems which drive most data collection activities of both the private and the public sectors.

Mr. Chairman, in my testimony I also discuss a very important report which was presented to the White House Office of Science and Technology Policy and the National Science Foundation on decision making and problem solving. This report focuses on the role of the theory referred to as subjective expected utility, which the authors identify as central to the body of knowledge about decision making. The panel pointed out that this sophisticated mathematical model and all of the assumptions under which it operates un-

derlies the basis for most contemporary economics, theoretical statistics, and operations research.

Some of the critical assumptions underlying subjective expected utility theory surfaced by the panel indicates that the theory assumes that when making decisions individuals and firms always choose to make themselves as well off as possible in a world where they know without any doubts everything that will happen. Moreover, if there is any doubt, it can be understood in very clear and exact terms.

Furthermore, the panel, given an earlier distinction it made between problem solving and decision making, makes it clear that the subjective expected utility theory is associated with decision making and has nothing to do with the components of problem solving; that is, how to frame problems, set goals, or develop new alternatives.

The panel went on further to point out that empirical research that shows how people actually make decisions and research on the processes people use to solve problems has been used to complement subjective expected utility.

Of importance to this morning's discussion, however, is that this empirical research has led to a descriptive theory which raises significant questions about the limitation of the prescriptive theory. The panel states:

> What chiefly distinguishes the empirical research on decision making and problem solving from the prescriptive approaches derived from subjective expected utility theory is the attention that the former gives to the limits on human rationality. These limits are imposed by the complexity of the world in which we live, the incompleteness and inadequacy of human knowledge, the inconsistencies of individual preference and belief, the conflicts of value among people and groups of people, and the inadequacy of the computation we can carry out even with the aid of the most powerful computers.

The panel then pointed out, "The descriptive theory of problem solving and decision making is centrally concerned with how people cut problems down to size, how they apply approximate techniques to handle complexity that cannot be handled exactly."

Well, of course, to anyone who does problem solving or decision making, this is not new news. What should be of interest to this Subcommittee, however, is the extent to which we as a society have accepted the unrealistic belief system which underlies the subjective expected utility theory, which as I stated earlier the panel identified underlies the basis for most contemporary economics, theoretical statistics, and operations research.

Now, the importance of this issue is brought home by psychologist Robin Hogarth, who has also spoken on the use of knowledge. I am referring to what he recalls as the "second industrial revolution."

He said that:

> The new revolution is being propelled by information and, as in the first revolution, relative success will be determined by the ability to handle the propelling force. There can be little doubt that the need today is for conceptual skills; that is, the ability to process information and make judgments.

Out of his work comes the notion that the real problem is to design organizational information systems that accommodate the fallibilities of human decision making. I believe that Hogarth is

right. And his observation brings me back to my initial claim that Government should play an important role in helping public and private policy makers create and use an information base for this country that will allow them to better understand, and thus help society adjust to the transformation that is taking place as we move to a global economy.

Additionally, the action step that is required is to take a leadership role in reviewing how changing conditions can require us to alter the manner in which we determine our information needs as well as how we collect, analyze and present relevant information.

In essence, we must make sure that we have a Federal statistical system which we prepare to deal with the realities of the world we will be facing in the 1990's and the 21st century.

In other forums I have suggested that this could be the role and the responsibility of the chief information officer, in essence, the CIO of the United States. This proposed position is not limited to the functions found in the existing role of the chief statistician within the Office of Management and Budget. Nor should this concept be limited to a set of statistical policy issues focused around the question, "Are we doing things right?" The job of the CIO is to direct it at the complementary question, "Are we doing the right things?"

It should also be noted that this is not a one-person job. However, this function does not require, nor should it be allowed to create, a new bureaucracy. The scope of the CIO responsibility should extend to all applicable statistically based information activities conducted in the executive branch of the Federal Government. And to fulfill this role, the CIO would need to be assigned through appropriate legislation both direct line and functional authority.

Under line authority, the CIO would have a relatively small staff of high-level, experienced specialists to assist in the management of statistical functions that are conducted across departments and who would also be able to provide advice and counsel to the decentralized units in the conduct of their activity, including budget coordination.

The staff should be large enough to get the policy and coordination accomplished but not large enough to believe it can do the work of the departmental statistical units.

Within this arrangement, we still need a chief statistician. This person, working within the office of the CIO, would address a continuous agenda of work involving information quality, reduction of bias, methods of collection, peer group review and public scrutiny, integrity of reporting and dissemination and so forth.

It would be the CIO's principal assignment to assure that the statistical agencies are never relegated to a narrow reactive function of providing limited information sets to the decision process.

The CIO would also be expected to encourage these agencies to establish a more proactive concept for developing a productive dialogue between provider and user.

Now, be assured I am not talking about creating a statistical or an information czar who omnipotently knows exactly what people ought to need or what information customers ought to value. Granted there is always the chance that putting more power in

someone's hands can lead to abuse. But what are the rewards relative to that risk? What is the risk of not taking any action?

If we do nothing to improve things organizationally out of fear, we are in essence saying we are more worried about protecting ourselves from the possible misuse of power than we are about the misuse of knowledge that stems from inadequate information systems. This is noteworthy because the latter, a concern reflected by the creation of this new Committee, has actually occurred while the former is only a possibility that can be minimized by developing appropriate safeguards.

Mr. Chairman, you have noted that information is a valuable resource. We need to mobilize if we are to be competitive in a new global economy. I agree. But I would like to make sure we understand that answers to our current situation are not found in improving the manner in which we gather information alone. Although accurate and timely information is critical, competitive advantage is not gained solely by collecting information better than anyone else. Competitive advantage is gained by getting users and providers together to ensure that we have better information that we can use better than anyone else.

Thank you.

Senator BINGAMAN. Thank you very much.

Before I ask any questions of you, I would like to ask Dr. Park to testify.

Dr. Robert L. Park is the executive director of the office of public affairs of the American Physical Society and is a physicist at the University of Maryland.

Your American Physical Society is of course the leading organization of physicists in the country, with over 40,000 members.

We are very pleased to have you here, Dr. Park.

TESTIMONY OF ROBERT L. PARK, Ph.D., EXECUTIVE DIRECTOR, AMERICAN PHYSICAL SOCIETY [1]

Dr. PARK. Thank you, Mr. Chairman.

Federal policy with regard to the dissemination of scientific and technical information is peculiarly schizophrenic. On the one hand we seek to promote wide dissemination of information to ensure that we reap the fruits of our investment in research but on the other hand we have policies intended to deny our economic competitors and military adversaries access to our science and technology base.

How can we prevent foreign interests from exploiting commercially or strategically useful information while preserving its accessibility to American citizens? The honest answer is we can't. There can be little doubt that U.S. databases and technical documents are a boon to foreign interests, but these same resources serve American businesses striving to remain competitive in a global economy, scientists and engineers seeking to stay current in their fields, investigators uncovering corruption, and citizens with a legitimate interest in the activities of their Government.

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[1] See p. 49 for Dr. Park's prepared statement.

In our open democratic society, the practical result of restrictions on information is to deny access to U.S. citizens and foreigners alike. Let me give you a couple of examples.

Some unclassified NASA reports carry a warning that the documents are not to be released to "foreign interests without the expressed consent of the Office of Aeronautics and Space Technology." In many university science libraries, foreign scholars may represent more than half of the users. Librarians to whom I spoke point out that even if they had the resources to establish the nationality of each user, such screening would almost certainly violate the university's antidiscrimination policies. As a result, they simply refuse to carry the NASA reports.

Another example: NASA also operates an electronic database called NASA RECON. It is an extensive electronic index of unclassified scientific and technical reports in aerospace and electronics. A stipulation in the RECON contract, however, bars foreign nationals from using the system. Many libraries have, therefore, discontinued their RECON subscriptions.

Similarly, there is a system called the National Technical Information Service operated by the Department of Commerce which collects and disseminates unclassified reports of Government-sponsored research. That of course includes most of the academic research in the United States. It is self-supporting through user fees and is available through most major research universities.

However, as with the NASA RECON, in recent years there have been attempts to restrict NTIS—certainly the entire FBI's library awareness program was predicated on the assumption that representatives of the Soviet Union should not be allowed access to NTIS. And in fact, there was a move in the last administration to privatize the National Technical Service.

Both of these actions, I think, run serious risks. The commercialization of NTIS runs the risk that the commercial provider will only provide that information that bears a return—that is, number of accesses—as opposed to that information which may be vital to our technological system.

Similarly, the head of a major scientific and technical library at a State university told me that if there turned out to be any restrictions on the use of NTIS database, they would be compelled to remove all material obtained through that service—at that library, about a million documents.

The problem is that information cannot be only a little bit secret. Once we accept any restraint on communication, we are drawn inexorably by a series of logical steps to a total prohibition against public disclosure. If we ban the export of certain information to the Soviet Union, does it make any sense to allow the Soviets or their agents to obtain the same information through the Freedom of Information Act?

If we deny Freedom of Information Act requests for the information, surely we cannot allow it to be presented at conferences that might be attended by Soviets or their agents, or placed on library shelves or included in commercial databases.

These policies fail to recognize the growing international character of scientific research. Such policies make less sense in the United States than in any other country on Earth. Many of the

great leaders of American science, including about a third of our Nobel Laureates, began their careers in this country as immigrants. Often, they arrive as students and choose to remain when their studies are completed. They are attracted, in part, by the openness of the American system, a system that traditionally welcomes the talented regardless of their origins. About 40 percent of all Ph.D. engineers entering the U.S. work force this year will not be U.S. citizens.

Today more than at any time in the past, we simply cannot maintain our technological leadership without this influx of foreign manpower. Every study shows that American students trail the rest of the industrialized world in mathematics and science literacy. If we were to begin today to reform our educational system, it would be at least a decade before the effects would show up in our work force.

In the meantime, we can ill afford policies that turn foreign scholars away or deny them access to recent developments. The work force we seem to be attempting to keep ignorant is, to a large extent, our own.

The openness of the American system is not a weakness, it is our strength. It is no doubt true, as the Defense Department and the CIA insist, that the KGB maintains an elaborate intelligence network aimed at the acquisition of Western technology.

The fact is, however, that the backwardness of Soviet technology has little to do with the success of the KGB in these endeavors. They trail because of the overly bureaucratic and secretive Soviet system and a stifled civilian economy.

Likewise the recent successes of the Japanese in the world's high-technology markets have little to do with whether they are better at keeping secrets. They prosper as a result of educational standards, hard work, the discipline to pursue long-range goals, and the freedom from the military burdens of a superpower.

We cannot meet their aggressive challenge with the defensive weapon of Government secrecy. We must recognize that we are in the midst of a revolution brought on by the computer, with the end nowhere in sight. Our current policy is a futile attempt to constrain that revolution instead of joining it. To persist in this negative policy is to ensure that other nations will assume the leadership in shaping the world.

We must also accept the fact that other nations will benefit from our investment in research, as we should in theirs. This is simply the entry fee into the revolution. Rather than shut foreign researchers out, we must try harder to stay abreast of developments in other nations. It is astonishing how difficult bureaucrats can make this seem.

The most important step we could take, at very little cost, is simply to increase funding for American scientists and engineers to attend international conferences. It is not the information communicated at those conferences that is of the greatest importance, it is the contacts that are made with foreign scientists, the visits to their laboratories, the collaborations that develop. These are the real sources of information into foreign systems.

Finally, we must strive to protect our commercial interests. But we must tailor our solutions to fit the problems. It has been ob-

served that the United States has failed to convert laboratory breakthroughs into commercial applications. Let us then address that failure and not attempt to compensate by tinkering with the open system that has given us the breakthroughs.

Thank you.

Senator BINGAMAN. Thank you very much.

Let me start with a question to Mr. Barabba.

Regarding your recommendation that we establish a chief information officer; where would you see him or her being located within the Federal Government, if we had such a person?

Mr. BARABBA. Mr. Chairman, a while back, I think it was during the Carter Administration, there was a Committee on Statistical Reorganization. They looked very deeply into this subject, and I think as I recall they recommended that the function be somewhere within the executive office of the President. And I believe I would probably still concur with that.

I am not as familiar with what has gone on in the statistical system over the last 5 or 6 years, so I would just condition that statement.

Senator BINGAMAN. The mandate that you give this person is intriguing. It reminds me of Peter Drucker's famous book about the effective executive where he says that the effective executive focuses on whether he or she is doing the right thing and not whether he or she is doing whatever he or she is doing well.

Are you trying to fix the basic problem of lack of strategy in the Federal Government by saying we can give somebody that job? If you are saying we need a person to ask the question are we doing the right things, that is a pretty big job.

Mr. BARABBA. It is the right things relative to the information policy, not necessarily the right things as to what Government ought or ought not to be doing.

Senator BINGAMAN. But don't they coincide to a large extent? If we are not collecting the right information to determine whether we are indeed gathering the correct information, that assumes a determination about the course we are taking. My point is: you have to determine what you want to do in order to know whether you are collecting the information that will allow you to meet these goals.

Mr. BARABBA. The distinction I would make is that the right things is to be relevant to the issues facing society and providing information that is relevant to that decision-making process. I think it would be wrong for someone to make a value judgment about what is right for society, because that is a function that we have for the legislative bodies as well as the executive branch.

So my position would be that the person's job is to be cognizant of the issues that are being discussed and making sure that there is the right information relevant to that issue so that a decision can be made based on that information.

Senator BINGAMAN. Can you give me some examples of deficiencies that you now see where, given an issue, we are not in fact doing the right thing in the sense that we are not collecting the right information to allow us to pursue what we have agreed is our national policy on a particular issue?

Mr. BARABBA. Again I am a little bit out of touch with exactly everything that is going on in the Government and particularly in the statistical agencies, but maybe I could reflect back on some of the things that were going on while I was in Government as an example.

I recall at one point there was a giant debate going on between the Census Bureau and the Department of Agriculture—I should say the Commerce Department and the Department of Agriculture about who should conduct the agricultural census. Several people were brought in to discuss this. I thought the important point that was made is that Agriculture was looking at the census as an activity that provided certain information that they needed, and Commerce was looking at it as an activity that provided certain information that they needed.

What somebody needed to do was to recognize that a whole role of how we grow and process nutrition in our society was the real question. It didn't matter whether it was in the interests of an agricultural community or in the business community, but it was capturing the efficiencies that could be gained if we knew how an ear of corn was grown and then processed through, including the retail distribution of that into the consumer's home.

I would say that somebody stepping back and saying:

> Now, I don't care where the information collection activity sits, but let's find out how we make sure that the information is available for policy makers to make judgments on the distributions on a very important commodity called food.

Senator BINGAMAN. How is that decision making done now? For example, how is it determined what information we need in the area of agricultural policy or in the area of education policy? You are proposing that we establish a chief information officer whose job it would be to focus on that. Who does it now?

Mr. BARABBA. I don't know who does it now, Mr. Chairman. My guess is several people do, several institutions do, and then there is a negotiation that takes place on the basis of their differences. And I must admit that I don't know for sure that it's not being done.

I would imagine the place where it is most likely to surface is in the Office of Management and Budget in the office of the chief statistician, but there the focus would be on issues of are we asking too many questions, how much time does it take to ask the questions, and can we coordinate this activity based on the amount of time it takes for the respondent to answer the question?

Senator BINGAMAN. So the focus there is much more on the efficiencies?

Mr. BARABBA. On are we doing things right rather than are we doing the right things.

Senator BINGAMAN. Right.

Does the Office of Information and Regulatory Affairs have a role in this, or do you see their job as being focused on the efficiency end of things rather than the issue of whether we are asking the right questions or collecting the right information?

Mr. BARABBA. Mr. Chairman, again I have to plead a little ignorance here because I have not seen that job over the last 4 or 5 years. At the time that I recall, it was more focus on the efficiency but it was with a heavy emphasis on the ability to reduce respond-

ent burden. I think some of that perspective or that frame of reference caused them to look at issues not on what was needed but on how they could reduce the amount of burden on the American respondent.

Senator BINGAMAN. I see. So you think their main focus is just on how to cut away or reduce the amount of information gathered?

Mr. BARABBA. At that time. I can't speak for their policy today.

Senator BINGAMAN. I see.

Dr. Park, you indicated that one of the main concerns, or at least a concern that you and your organization have, is the adequacy of the work we do to track scientific and technological advances around the world, in addition to your concerns about us not having free enough release of information that we develop.

We perhaps do not do a good enough job of tracking what scientific activity and technological activity that is going on in other parts of the world.

You indicate that some of the problem could be fixed simply by providing sufficient funds for U.S. scientists and engineers to attend more international conferences.

Are there specific examples where scientists who ought to attend international conferences, don't because of lack of funding?

Dr. PARK. It's a general problem. The tightness of funding in recent years is really evident when you go to an international conference. If the conference is held in the United States, of course it has an enormous number of foreign visitors. If the conference is held abroad, the number of American scientists attending is often a very small percentage. So it seems that we are traveling much less than they.

Now actually the task is easier for us than it is for most countries because most international journals are now published in English and most international conferences, virtually all the international conferences, are conducted solely in English. So it is really easier for us than for other countries. But I think we are putting a lot less into it.

Senator BINGAMAN. I spoke the other day with some people who keep track of this general subject, and I said that I felt the Government needed to do more to facilitate the collection of information about science and technology development in Japan because they are making such advances there in various fields.

The response I got was that there is no market for that information in the U.S. business community. They cited me one particular example, where a subsidiary of Bell & Howell is trying to sell a service which essentially reports on scientific papers and activities going on in Japan, and they are having great difficulty getting enough subscribers for that service.

Are you familiar with this problem? Is that a valid problem, are we trying to supply something here that nobody is going to read?

Dr. PARK. I am afraid that may be partly the case. The difficulty is that—and I hesitate to comment on this particular case because I don't know the details of it—but in general if you give somebody the task of summarizing what is going on at international conferences, he is likely not to be sufficiently an expert in each of the subjects that comes up that he is going to really spot what the key

points are. You have got to have the people who are actually doing the research over there listening.

Now, we can do a lot more than we do, for example, in debriefing scientists when they return. I hesitate to use that term. I have always been puzzled by the fact that in visiting the Soviet Union, for example, when one comes back there is so little debriefing, it is so rare, from the Federal Government.

Now, I would not like to be instructed by my Government when I go to the Soviet Union to look for certain information because in certain foreign countries one might be regarded as a spy if he does that. But I have absolutely no objection to being asked what I learned while I was there that might be of significance. And certainly I think other Governments do that quite regularly.

Senator BINGAMAN. How do you recommend that Congress deal with this problem? You described a pervasive problem with regard to scientific work going on in our own country. The information or technology very quickly falls under some type of restraint as to who can see it, that stifles the development of it and the dialogue that is needed in order to move ahead. That is my understanding of your basic testimony. Now, how does Congress deal with that problem? If it's a pervasive problem, as you say, it's not just a matter of changing a statute.

Dr. PARK. Well, it's sort of a moving target. It has been changing as the years go by. For a number of years, in the first years of the Reagan Administration, we had a constant problem with interference with scientific conferences in which foreigners were not allowed to attend certain conferences, that kind of thing.

That problem began to recede, and in recent years I think most of our concern has been with the restrictions on electronic databases. I think our security zealots have a real fear of the power of the computer to assemble information from public sources.

We are not talking about classified information, we are talking solely about unclassified information and the restrictions that are placed on the so-called sensitive information.

Senator BINGAMAN. Do you put out the new online computer service, "What's New?"

Dr. PARK. Yes, that's correct.

Senator BINGAMAN. Can you describe that for me a little bit?

Dr. PARK. Well, the American Physical Society issues a one-page electronic bulletin each week from my office, which attempts to keep the scientific community informed of what is going on in Washington that might affect them. So we cover issues of secrecy, for example. We cover some late-breaking scientific developments. More generally we were covering congressional activities and administration policies, that sort of thing.

Senator BINGAMAN. How widespread is the dissemination of this? How many folks are plugged into this service?

Dr. PARK. In all honesty, we have no idea. We get an electronic count. It goes out through GTE's telemail system. We get an electronic account of how many people access it. But we urge department chairmen to access it for the entire department. Bell Laboratories accesses it, for example, and puts it on their internal computer network so it's available on everybody's terminal on Monday

morning. And it's copied onto four or five other electronic networks right now.

So we honestly don't even have a good guess for how widely it is accessed.

Senator BINGAMAN. On the issue of collection of scientific and technological information worldwide; is it fair to say that most of our capability to do that is in the intelligence community? Is most of the U.S. Government's capability to do that in the intelligence community and, therefore, sort of by definition very much constrained in the dissemination?

Dr. PARK. Yes, I think that is certainly so.

Also I am somewhat skeptical of the activities of the intelligence community in that regard. I can tell you an example in which a very prominent American astrophysicist was visiting the Soviet Union shortly after the launch of Sputnik II, and he was contacted by an intelligence agency that asked him to be on the lookout when he was in the Soviet Union to try to find out what the scientific package was in the Sputnik II, that they had had their best agents working on this for months and were unable to find—or weeks, at least—and were unable to get any information at all.

He arrived in the Soviet Union and simply asked his host. He said, "People in the United States want to know what's in your satellite?" And he said, "Well, that's interesting. Would you like to see?" And he escorted him to a trade fair where there was a model of the satellite sitting in the trade fair. He was allowed to walk up, look into it.

He noticed that it had two what appeared to be geiger counters inside. He recorded the numbers on the geiger counters, walked into an electronics shop on the streets of Moscow, asked if they had any in stock, and they sold him two of them.

He returned to the United States with these and turned it over to the intelligence agency, which thanked him. They said this was a great coup for them, that they had been unable to get this information. And they asked if they could borrow them, and he said yes, and he didn't see them again for 6 months.

When they were returned to him, he was at a Government laboratory, they were returned by a security courier. They were classified as top secret.

Now, you know, I often wonder who the secrets are being kept from.

Senator BINGAMAN. This was after Sputnik?

Dr. PARK. That was after Sputnik II, yes.

Senator BINGAMAN. Yes. Do you have any reason to think that the problem exists today or has changed? Has it become worse or better?

Dr. PARK. I certainly have no reason to believe it has gotten better.

Senator BINGAMAN. So you remain skeptical about the quality of our information gathering through our intelligence community, is that right?

Dr. PARK. That's right. Again, to stay at the cutting edge of science and technology, the only people who are really in a position to make those judgments are the people who are involved in that work. And it's difficult for me to see how an intelligence agency, no

matter how good the people they hire, how those people can really stay current on what is the information they need. The only real experts on that are the people doing the work.

Senator BINGAMAN. All right.

Well, I appreciate the testimony very much.

Mr. Barabba, I appreciate your testimony.

We will take this under consideration and see what we can do, if anything, on these issues.

Thank you very much.

Our final panel this morning is Dr. Courtenay Slater and Mr. Christopher Cross.

Dr. Slater is the president of CEC Associates, which is an economic consulting firm and is currently the chairman of the Council of Professional Associations on Federal Statistics. She is also a member of the Committee on National Statistics of the National Academy of Science. From 1977 to 1981 Ms. Slater was chief economist with the Department of Commerce and from 1969 to 1977 was the assistant director of the Joint Economic Committee.

We are very pleased to have you here and look forward to your testimony.

TESTIMONY OF COURTENAY SLATER, Ph. D., CHAIRMAN, SLATER HALL INFORMATION PRODUCTS, AND CHAIRMAN, COUNCIL OF PROFESSIONAL ASSOCIATIONS ON FEDERAL STATISTICS [1]

Dr. SLATER. Thank you, Mr. Chairman. I am very pleased to be here. I should note that the statement contains only my personal views and not those of the Council of Professional Associations or any other organization.

I would like to start by welcoming the formation of this Subcommittee and the interest you are taking in these questions. I think that is very important that we now have a congressional locus that we can look to where these kinds of questions have a central focus.

I have also been very encouraged to note the attitude of the new administration toward statistics, the emphasis that President Bush gave it in his budget message, the fact that we now have in place in OMB a chief statistician who is working very hard and very skillfully to get some things done, and of course the establishment of this working group of the Economic Policy Council that Dr. Boskin described this morning.

It may be that the present moment is the best chance in some years to achieve some significant improvements in the organization of the coordination of the statistical program, and I would like to give you my thoughts on some of the changes that are needed, but I would first like to spend a few minutes describing the problems as I see them.

The problem really stems from the fact that we do have such a rapidly changing and complex economy and society that we are trying to measure. It is not that our statisticians are not capable and not that they don't work hard, but they have an overwhelming job to do. And they have not found it possible to keep up.

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[1] See p. 54 for Dr. Slater's prepared statement.

And let me cite a couple of examples, although there are lots. One has to do with measuring our role in the international economy, which has been discussed already quite a bit this morning. The problem that has gotten so much publicity is the measuring of imports because our imports increased dramatically and we have this antiquated system of recording them which just couldn't handle it. A lot of work has been done to improve that, but that is just the tip of the iceberg.

It is not just flows of merchandise trade that we need to measure, but flows of services, flows of investment capital and flows of human beings. These also have increased rapidly and changed in their nature, and these are much more difficult things to measure.

What constitutes foreign ownership of U.S. productive facilities? Big companies are owned by lots of people. What percentage of ownership has to be foreign to call this a foreign company? This is an example of the kinds of decisions that have to be made.

As you were discussing with Dr. Boskin, we do have regular surveys of direct foreign investment made by the Commerce Department. It is very hard information to get because you have to get this information from people who are not U.S. citizens; you have to go to foreigners and say "What have you invested in the United States?" We have no way of compelling them to tell us. The investment may come from one country but may have originated somewhere else. It may come here from Switzerland but it really originated in Saudi Arabia or wherever. There are complex concepts here to be struggled with to get really good information.

Similarly, or even worse, are short-term investment and cash flows. These are measured, to the extent they are measured, by the Treasury Department rather than the Commerce Department, so here you have another department involved, and you've stuff that is very hard to measure, that moves back and forth very rapidly in very large volumes. And, of course, you have illegal flows of cash in and out of the country of unknown quantities.

How many foreign workers enter and leave? There is another department who measures this: the Justice Department. We don't know how many foreign workers, but even if we knew how many, we wouldn't know what we need to know. What we need to know is what do they do when they get here, what role do they play in the economy? Do they help us meet our labor shortage, do they help us keep wage rates down here so that more production doesn't go abroad to low-wage countries, or do they take jobs away from American workers and place strains on our social welfare system?

The way in which we answer those questions is obviously crucial to making policy, but the data and even the concepts on which data are based are really not adequate at all. It is not that our statistics on foreign trade and finance are worse than they used to be. In some respects they are better. But our need for information has grown enormously because we are much more involved in the world economy than we used to be, and the questions have become more complex.

As a second example, and again one that has been mentioned this morning, it is well recognized that we have shifted from a goods-producing to a predominantly service-producing economy.

And that although we try, we don't measure services as we measure goods.

But to state it that way really disguises the hard questions. The hard questions are not really measuring the traditional kinds of services that we are familiar with. We have good measures of barber shops, dry cleaners. But the dry cleaning industry isn't growing. That is not what we need to know about so much.

What is a good? What is a service? How do you classify computer software? It happens to be classified as a service in our standard industrial classification code. It's not clear if that's right or wrong. The kind of computer software that is mass produced now seems to have all the traditional aspects of a good: It is physical, you can pick it up, you can handle it, it is transportable, it's storable. You know, it smells like a good, tastes like a good; why is it a service?

Well, there are some reasons, and I don't mean to make a joke of this. But these are hard concepts. And it is a different kind of good or service, whichever it is, than either a steel mill or a barber shop. You wouldn't measure the output of computer software in tons, certainly. You have to measure it in terms of what it can accomplish.

Senator BINGAMAN. Let me just ask about that, how do we measure the output in this country in software?

Dr. SLATER. Well, I am sorry you asked because I don't know. [Laughter.]

Senator BINGAMAN. Okay. All right.

Dr. SLATER. It's very difficult to measure computer output, because you don't measure it in the size of the computer which obviously has shrunk. You try to measure it in terms of the computing capacity, you measure it in processing units or speed and so forth. The Bureau of Economic Analysis of the Commerce Department has had a longstanding project in which they have had a lot of cooperation from IBM and I think other companies to get a handle on this because they need to know it in order to get price measures for computers.

And they did introduce price measures for computers for the first time into our GNP accounts 2 or 3 years ago and made an enormous difference in the overall price measure or deflator for producers durable equipment because computers have become such a big part of that. And all of a sudden we found out that we took into account the computers, where prices have been going down, of course, rather than up like other kinds of equipment, that we had not had so much inflation in the cost of capital goods as we had been reporting; but significant change.

And they still don't have a really good price measure of computers. This is not a criticism of the Commerce Department. They know they don't and they are working on it, and so is the Labor Department. But it is difficult.

Another kind of example: New industries emerge. One is the optical technology industry where you put data on optical disks rather than magnetic disk. I am chairman of a company that is involved in that myself, so I have been very interested in that.

When we organized this new company we had to figure out what SIC code we were in in order to register so we could file tax re-

turns. And there wasn't any SIC code that fit this, of course, because it was a new industry; it wasn't there.

So we end up in some miscellaneous category called "not elsewhere classified." And so do thousands of other new businesses doing new things. And this happens every year. So some of the industries you are most anxious to know about because they are new and innovative are all lumped together in a statistical category called "not elsewhere classified."

And it's hard to know what to do about this because our statistical system is set up to measure and categorize the things that were there at the time it was set up, but new things come along.

Senator BINGAMAN. Is there a reason why we don't update those categories annually?

Dr. SLATER. Yes. Maybe we should. We now are implementing a revised SIC code, which will help, but it won't help enough. It was not as comprehensive a revision as probably we needed, and it takes 2 or 3 years to get everybody to agree on it and a couple more years to implement it, and by that time you are already sort of behind.

The process of doing this has to be one of getting all the agencies in Government that produce statistics to agree on it, because you want the Bureau of Labor Statistics and the Census Bureau and the other agencies to use the same categories so that their statistics are measuring the same things and you can compare them.

Senator BINGAMAN. When they disagree, who decides?

Dr. SLATER. Well, they have a Committee. They publish a proposal in the Federal Register. There is extensive opportunity for public comment, and the public does comment because every industry wants its own SIC code–and you can see why. And then ultimately, if there are questions that are not resolved by consensus, OMB—this is one of the important statistical policy functions of OMB to make the final decisions on these things and to issue the new code.

It does need to be updated much more frequently than it has been in the past. It's an expensive proposition because then you've got to publish all your statistics on a new basis. It costs the agencies money and work and effort to do it.

But in addition to updating, there needs to be a lot of looking by people, capable people in this area, at the way we go about creating categories: Can we just have goods and services; can we classify things by firms rather than by end products or vice versa; or are there other kinds of cross-classifications we need as well? Do we need a cross-classification for the information industry, for example? Many people would say that we do.

So there is a lot of basic research in this area that is begging to be done, I think. And until that gets done we are going to be running behind in terms of measuring the kinds of companies that produce new technology.

And this is a problem because this is not only new products, there are new kinds of companies, new kinds of entrepreneurship. You can start a software company in your spare bedroom or your garage—and some people have done that and become industry leaders. You don't do that with a steel mill. This is a different kind of

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capital investment, a different kind of entrepreneurship, a different kind of international situation and international questions.

You mentioned in your opening statement that one of the things you were concerned about is: do we ask the right questions. Clearly the answer is no.

We don't always ask the right questions because our forms are designed to ask questions about things that we understand from the past and the questions don't apply to new things.

The same way with our household surveys, our forms were designed to ask questions about four-person, families with a husband who worked and a wife who stayed home and two children. And this is of course no longer the typical family. The statistical agencies, of course, know this and forms do get changed and they do make efforts to keep pace, but it is a struggle. So the inherent challenge is considerable.

The ability of the statistical agencies to respond to this challenge has been further hampered not only by inadequate budgets but by a complex set of bureaucratic stumbling blocks and above all by lack of central coordination and of priority attention at the top levels of Government.

The director of a statistical agency—and this is true of other agencies, too; it's just that statistical agencies are where I have had some experience—faces not only a budget ceiling but also a personnel ceiling, an information collection budget ceiling, and a mind-boggling array of regulations pertaining to hiring and procurement and anything else that they want to do.

These regulations have been established in pursuit of important goals and are well meant. But taken altogether they impose substantial inefficiencies on Government programs.

You also asked in your opening statement whether we were managing things as well as we should be, and the answer is no, we're not. And part of the reason is because there are all these rules and regulations that agency management has to comply with, and although they are important in their purpose, together they create stumbling blocks to efficiency. In these days of tight budgets, I think we need to try to stretch taxpayers dollars as far as they will go, and I think this means giving agencies management somewhat more flexibility to use their tight budgets as efficiently as they can.

In particular, I hope this Committee will take a close look at the Information Collection Budget because that comes under your purview, and at the ways in which respondent burden is measured. The present system, in which each department has to have an Information Collection Budget which measures how many hours the public spends filling out their forms, makes no distinction, for example, between respondent burden imposed on individuals and imposed on businesses. There is quite a bit of evidence that most *individuals,* as opposed to businesses, don't really mind filling out statistical forms, they don't consider them a burden, some of them enjoy doing it. Businesses are quite another story.

But neither businesses nor individuals regard statistical queries as anything like the same kind of burden as filling out, say, a tax form. A completely different animal, but we lump them all together in these measures of burden hours.

The burden totals reported by OMB based on the present Information Collection Budget are simply not meaningful. Intentionally or not, they seem designed to document alleged progress in reducing paperwork burden imposed by the Government on the public. And of course, the Paperwork Reduction Act requires them to achieve certain percentage reductions every year, so it is hard to blame OMB for trying to show that they have met the goals of the act.

They are complying with the law, but in fact these measures are just not meaningful. It seems doubtful to me that any such progress in reducing reporting burden exists. I very much doubt that the public feels 10 or 15 or 25 percent less burdened with paperwork today than it did 10 years ago. That is not a scientific conclusion, Mr. Chairman, it is my own observation based on the paperwork that I do and that the people I know do.

If we are serious about wanting to reduce paperwork, and I think we should be, the Information Collection Budget and the annual percent reduction requirements should be abandoned in favor of more meaningful approaches. Two fruitful areas to look at it, it seems to me, would be further efforts to simplify tax forms, which are, by all odds, the most onerous public reporting burden. And it's not that IRS doesn't try to make good forms, but they have to cope with changes in tax law, and there is a lot more they could do, I am sure. And similarly with Medicare forms, which are a particularly difficult kind of paperwork imposed on the elderly.

Statistical collections represent only a tiny fraction of the total paperwork the Government requires of individuals. It does not follow, however, that we should be cavalier or unconcerned about statistical reporting burden. We should take effective actions to contain it. Again, we should forget about the window dressing of the Information Collection Budget.

An area that we should look at very hard, I think, is increased use of what are called administrative records, by which the statisticians mean information that is collected anyway to meet program management needs: tax information, medical information from Medicare forms, all kinds of information we collect about businesses and individuals for legitimate, important program purposes, which could, and does, provide us with valuable statistical information and could be used much more than it is.

Greater use of administrative records, in many cases, would not only decrease reporting burden and in the process save money, but also would result in better data. Why isn't this done more? Because it requires cooperation among agencies. It requires cooperation of statistical agencies, with agencies which are not primarily statistical agencies which collect this administrative data. It sometimes requires adding an extra question to an administrative form to save a whole statistical survey, but it's one agency wants the question on and there is another that has to pay to do it and so forth. So there are difficult questions of cooperation.

And this is one of the reasons why it is so important to have a central coordinating mechanism for our decentralized program.

We have learned in the 1970's and 1980's that we can't take for granted the maintenance of this statistical coordinating mecha-

nism. We used to, earlier in our history, have one in OMB that worked pretty well, I think.

The authority and the responsibility for this statistical function has long been encoded in law. It is presently in the Paperwork Reduction Act, but traces back to prior legislation for many years. But the law left OMB free to progressively reduce the resources and the authority of its statistical policy office during the 1970's and it left the President free to transfer the statistical policy function to the Commerce Department in 1977.

The original Paperwork Reduction Act of 1980 transferred statistical policy back to OMB, but it placed it within the Office of Information and Regulatory Affairs. This, in my view, was a very bad place to put it. The people that were running OIRA weren't interested in statistical policy, and we came very close to seeing any identifiable staff for that function totally abolished in the early 1980's. It was only the strong insistence of the Congress, I think, calling attention to it that averted that.

Subsequently and in more recent versions of the Paperwork Act, the position of Chief Statistician has been established by law. But the staffing of this function remains woefully inadequate. It is still in OIRA, which is a bad place for it to be.

Legislation that may renew or replace the Paperwork Reduction Act certainly should maintain the statistical policy function and authority in law. It doesn't mean that the wording of section 3504(d) should not undergo review and change, but it is very important that we have established in law the responsibility for statistical policy coordination.

I would suggest, however, that these responsibilities should be removed from OIRA and placed in a separate office, headed by a Chief Statistician reporting to the Director of OMB. I don't know that this is terribly different actually from Mr. Barabba's proposal. He called it a Chief Information Officer, I might have chosen the term Chief Statistical Officer—but somebody who worries about this at a high level within the Executive Office of the President and has the authority.

Given OMB's track record over the past decade, it is important that an office as well as a function be explicitly established in law and that the law require that the office be given adequate staff.

I think an organizational change getting this function out of OIRA would accomplish several things. First, it would elevate the statistical function in seniority and visibility, giving this office the authority to deal effectively with the heads of statistical agencies and placing it more nearly on a par with counterparts in other countries with whom we must cooperate on statistical matters.

Most other countries elevate their statistical policy function and attach more importance to it than we do.

Removing statistical policy from OIRA would get it out of the environment where it has been largely neglected, and also would help make clear in the public mind that this information is statistical information and not information that we are concerned about for regulatory purposes.

And it would facilitate the ability of the statistical policy staff to work closely not only with the forms clearance staff in what is now OIRA but also with budget examiners elsewhere in OMB. The way

that we really decide that we are going to collect some new information or do it a different way is through the budget process because that is where the authority and the money come from. The statistical policy people need to work with the budget people. They need an organizational arrangement that facilitates that. This is a fairly simple change, I think, in current law, but it would accomplish a lot.

In closing, I would like to make one broader comment about your consideration of the renewal or replacement of the Paperwork Reduction Act. I hope that you will review the current law from the viewpoint of its adequacy in fulfilling the Government's affirmative responsibility to provide public information as well as from the viewpoint of reducing paperwork. This perspective would be more easily achieved, it seems to me, if we could talk about the Public Information Act or the Information Policy Act rather the Paperwork Reduction Act.

But whatever the name, the law's statement of purpose should begin with the affirmative responsibility of Government to supply honest, accurate and relative information for necessary public purposes, rather than with the more negative consideration in minimizing paperwork.

The latter is important, but it is meaningful only as it relates to proper administration and coordination of activities intended to fulfill the important public purpose of supplying information.

The specific suggestions I have made for strengthening statistical policy are just one alternative, and others may well have better suggestions. But I would like to conclude by underscoring my view that legislative action is needed in this important area and that the legislation should be considered in the context of information policy, not just of paperwork reduction.

Thank you very much.

Senator BINGAMAN. Thank you very much.

Our other witness today is Mr. Christopher Cross, who is vice chairman of Macro Systems, Inc., where he is responsible for areas of new corporate development with special emphasis in the fields of education, training, health, and international and public policy. He is coming to us today with particular expertise in educational research and policy analysis and with a longstanding interest in quality of educational statistics.

We are very pleased to have you here.

TESTIMONY OF CHRISTOPHER T. CROSS, VICE CHAIRMAN, MACRO SYSTEMS, INC.[1]

Mr. CROSS. Good morning. Thank you, Mr. Chairman.

It is indeed a pleasure to be asked to appear before this new Subcommittee to discuss important issues relative to whether or not the Federal Government is collecting the right information in the right way, and to address the question of what those critical areas are.

As you mentioned, I would like to talk specifically about education this morning and also to address the topic of information dis-

[1] See p. 66 for Mr. Cross' prepared statement.

semination. Without having the proper dissemination tools and mechanisms in place simply collecting the right kind of information is not terribly productive.

Let me begin by noting that in the past decade or so education has become an area of enormous concern to citizens and policy makers in virtually every area of this country. Significant reforms have been enacted in most States and the movement to achieve real reform in our schools has become a significant element of political life at all levels of Government.

For ordinary citizens, policy makers and educators, it is critical to have good, accurate, current data. Until the middle of this decade both Congress and the executive branch failed to recognize the importance of providing the financial support and leadership which is necessary for this function in the area of education.

Thankfully, for the past 4 years or so that recognition is there, although I am not certain that there is the will on either side to actually make good on the already-made commitments, to say nothing of tackling other work that must be done.

For example, in the last Congress a commitment was made to expand the National Assessment of Educational Progress, known as NAEP, to include pilot studies of math and science at the state level. That commitment implies more than doubling the NAEP budget to $20 million by 1993.

Other areas involving the National Center for Education Statistics, which is the chief collection area for education data, also merit some attention. For example, in Public Law 100-297, Congress mandated appointing a panel to issue a report on education indicators. This is much along the line of the concept of the economic indicators that Dr. Boskin talked about earlier this morning.

That law was signed over a year ago, and to date the Center has been unable to appoint members of that panel. The problem in this instance stems from the fact that the panel falls under the Federal Advisory Act, an area of concern, I believe, for inhibiting the acquisition of outside advice and expertise for the Government.

A similar set of problems affect several other provisions of Public Law 100-297, and here I would reflect some of the same comments that Dr. Slater made earlier. For example, authority was given the NCES Commissioner to publish reports, appoint staff and arrange contracting authority separately. These efforts have also been similarly blocked.

The point of all this is that we simply cannot continue handcuffing units of government that provide information and data with the same kinds of bureaucratic red tape that is forced on other parts of the government. Organizations like the Office of Educational Research and Improvement and NCES must be free to seek advice and publish reports. They also must be able to hire staff and get contracts approved in shorter time periods than agencies usually require.

Regarding education data collection, there are several areas where I do believe we need to broaden our sights. For example, the Department of Education still tends to think of itself as the agency of traditional education providers, when there are in fact many instances where a great deal of education goes on outside of traditional school walls.

For example, I am told that in Flint, Michigan, General Motors operates a school in the plant that allows GM workers to earn a high school equivalency.

In other parts of the country, banks and insurance companies, among others, are investing enormous amounts of resources in teaching basic skills to new and prospective employees.

By not including these programs in their data collection efforts, due I am certain to cost as well as philosophical considerations, the Department of Education is simply not seeing the full picture of what goes on out there that fits a realistic 1989-style definition of education.

I would also say that we need to pay more attention to collecting information about student performance. We really do need more data collected more often and at a much lower aggregation level. Currently at the Federal level that kind of data is only valid regionally. Even with the NAEP pilots, it will only be valid at the State level.

We also need to take a look at the proliferation and overlap among data collection efforts. The National Center of Education Statistics probably collects far less than half the total data on education just within that one department. Data is collected by virtually every program office, by the Office for Civil Rights and the Office of Planning, Budget and Evaluation. And in addition, the National Science Foundation, the Census Bureau, the Agriculture Department, and other agencies also collect education data.

It is understandable that all too often overlap and conflict arise out of these data collection efforts, and the beleaguered data provider may simply be overwhelmed by all of these requests. They may feel at the local level they give a lot and get back very little.

As I mentioned, I would also like to talk about education information dissemination. The best, most accurate information is of little help to anyone if it is not made available in a timely manner through channels that are available to the user. While the department has done much to improve this in the last few years, much more can be done. This might include making the latest data available through public networks like the Source as well as professional networks like Dialogue. It might also mean equipping public and university libraries with the most current statistics and providing a consumer hotline and new technology devices like the fax machine, to be sure that requests can be fulfilled almost instantaneously.

We also have the potential of home computers that can be used at the local level to analyze and look at data from that perspective.

Finally, I would like to say that I really believe that we are now faced with a situation in education where the existing structure in education information, research and dissemination that is out there was developed over a quarter of a century ago. The world has changed a lot in that time, not only technologically but in terms of the providers that are out there, whether it be in data, in technical assistance, in dissemination or whatever.

Today we have a hodge-podge of data collection and research efforts, we have development schemes, and we have lots of dissemination providers. I suggest the time has come for Congress and the administration to take the initiative to design a new education re-

search, development and dissemination strategy for the 1990's and beyond.

To do so, I suggest appointment of a blue-ribbon commission to study the problem and to make recommendations to guide this area's development over the next quarter of a century, to take it out of the ballpark of either the Congress, or the executive branch. I suggest the National Research Council of the National Academy of Science be asked to convene such a panel.

I estimate that such a panel might cost roughly $1 million. That is a small investment indeed when you consider the hundreds of billions of dollars we spend each year on education and how each of us needs to make better use of that available information.

Thank you. I would be happy to answer any questions.

Senator BINGAMAN. Thank you very much.

Thank you both very much.

Let me just ask a very few questions here.

Dr. Slater, your suggestion that we essentially move this information collection responsibility out of OIRA and have it directly accountable to OMB I think is an interesting one.

What would you see OIRA as doing after that? This is supposed to be one of their major responsibilities. I gather you feel it has been neglected. What would they continue to do?

Dr. SLATER. Well, I am probably not the best person to answer that question. I am not here to argue for the continuation of OIRA. You may examine this and find that it is not needed. There are other management-type functions that OMB undertakes, which I think are important. They have, of course, spent a lot of effort on the questions pertaining to regulation and deregulation, primarily deregulation.

They do have responsibilities for coordinating computer procurement data processing equipment throughout the Government. There things are important, but not ones that I know much about.

They do have responsibilities for what is called the forms clearance function, where anyone in the Government who wants to take a survey of the public, statistical or otherwise, covering more than 10 people has to get approval from OMB to do that. That is an important function because it is how we guard against the collection of useless information and duplicative information.

And I was not proposing moving those functions around, although when you look at the question, you may want to. But there is in addition to that a function of coordinating the activities of the various statistical agencies. The actual statistical information collection of course occurs in the Department of Commerce, the Department of Labor and 50 or 100 other agencies of Government.

So it is very important that these be coordinated from the point of view of quality standards, using the same definitional concepts, and being sure that the statistics that we need most are collected by somebody, that they don't fall through the gaps.

For example, the statistics the Council of Economic Advisers needs to forecast the economy aren't collected by the Council of Economic Advisers, but somebody has to make sure that the Labor Department doesn't leave something out because they think the Commerce Department is doing it or vice versa or that they don't

overlap and both do it and so forth. And that is what we usually speak of as the statistical coordination function.

I just think that would be better off out of OIRA, partly because it has been neglected there, partly because it is so important that they be able to coordinate with the people who are doing the budget planning work for the Departments of Commerce and Labor and so forth.

Senator BINGAMAN. OMB's history in the last 8 years has been one of being fairly heavily involved in policy—policy making as well as policy implementation.

Is there some concern that shifting this coordinating responsibility to be directly under the head of OMB might in some future incarnation bring into question the validity of the information that is being distributed?

I know we have a lot of questions here in Congress about the validity of OMB's estimates of what is going to happen in the economy. Would we have a similar set of questions about the rest of the information?

Dr. SLATER. It is very important that the statistical system be protected against that kind of danger. I don't want to imply that there is any such threat at the moment; I don't think there is. But there has been in the past and there could be again.

An important function of this statistical policy office has been and should continue to be insuring the integrity and the objectivity and the honesty of the statistics that come out. They do this, or at least in part, they do it by a very complete and strictly enforced set of rules about how things are released. Statistics that come out of the Bureau of Labor Statistics, for example, aren't seen by anyone else in Government except the President before they are released publicly and so forth.

In order to be sure that some possible future Director of OMB, say, would not interfere with that objectivity and integrity, it is very important that the person who is head of the statistical policy office or the information office or whatever you may call it be the kind of person who is going to, in effect, stand at the gate and keep that from happening.

I think this gets you into the question of how that person is appointed and by whom and what kind of qualifications you build into the law that that person has to have. That person, it seems to me, should be an individual of integrity, also a person with professional qualifications to do this kind of work, someone who is familiar with statistics and cares about statistics and has the right kind of professional background.

It has been fairly widely suggested that this position ought to be a presidential appointment subject to confirmation by the Senate, possibly for a fixed term that did not coincide with the turnover of administrations.

So these are all questions I think you should take a hard look at.

Senator BINGAMAN. Mr. Cross, your suggestion that a blue-ribbon panel or a blue-ribbon commission is needed to look at the whole area of information collection and dissemination in education, is an interesting suggestion.

Your view on that, I gather, is that the panel would exist for a year or some shorter period, then make a report which would allow

us then to make the necessary structural changes in the Government and give this the proper attention? Is that the idea?

Mr. CROSS. Yes, it is, Mr. Chairman. I suspect a year to 18 months would be required. It often takes several months just to get the process of something rolling. I think probably a year is a little short. Eighteen months is probably an optimum time.

There are many, many institutions that the Education Department funds and supports in this area. What needs to be done, I believe, is to create some sense of the structure of how all of these organizations fit together. They have come to be in a very ad hoc way. And part of the problem is, that, for example, advocates of vocational education or special education, have developed their own units. And then there are similar groups in other agencies, and there is no coordination. There is no overall strategy to this.

Senator BINGAMAN. The way this panel is organized would be very important so that it did not get captured by one particular group that had a specific aspect of the problem foremost in mind, to the detriment of the rest. Is that correct?

Mr. CROSS. Yes, that's right. I think you would have to be careful that it contained both people who could represent those points of view but also that the majority of the representation was of people who did not have a vested interest in specific viewpoints and institutions on this matter.

Senator BINGAMAN. Let's conclude with that. We may have some additional questions we would ask you to comment on in writing as we go forward. I appreciate very much your testimony. I think we have gotten a lot of good suggestions, and I hope we can follow up on this at a future hearing.

Thank you very much.

[Whereupon, at 11:35 a.m., the Subcommittee was adjourned.]

APPENDIX

Statement by
Vincent P. Barabba

Hearing on Federal Information Policy

Dirksen Senate Office Building
May 15, 1989

Committee on Governmental Affairs
Subcommittee on Government Information and Regulation
Senator Jeff Bingaman, Chairman

Mr. Chairman,

Over the last 20 years, in addition to working in political campaigns throughout the country and a large government agency that attempted to account for everyone in the country, I've worked in three large multi-national corporations. In each instance, I was recruited by these firms because they had, on their own, come to the conclusion that increased competitive activity required them to better understand the markets in which they, up until that point, had a significant market position. In each of those situations, the most difficult part of my assignment was to figure out how to overcome inherent resistance toward changing the ways things had been done in the past -- particularly in the use of market information that was perceived to be inconsistent with existing opinion and beliefs.

Now you might ask the question, "Why would management wait so long to seek an improved understanding of the market place?" One of the reasons, of course, is that up until recently, the problems facing these managements were not as threatening as they are today. Their decision-making ability seemed to be more than adequate. After all, most of senior management grew up in the early to middle part of the 20th Century; a period when the United States, as a world power, seemed to be invincible both militarily and commercially. But, as we all know things have changed.

Today, we live in an era in which the allowable margin for error in both public and private decision-making is narrower than ever before. Partly, this is because:

1. We are confronted by the realities of a world of limited resources, rather than the theoretical one which we all studied;

2. There is increased societal and market complexity; and,

3. There is greater economic and political interdependence of both domestic and international sectors of activity.

Recognition of this more narrow allowable margin for error should cause us to take a closer look at the role of information in the decision-making process.

Based on my experience, it's my belief that government should play an important role in helping public and private policy makers create and use an information base for this country that will allow them to better understand -- and thus help society adjust to -- the transformation that is taking place as we move to a global economy. This morning, I will discuss one of the ways government can help. Quite simply, I believe government should take a leadership role in reviewing how changing conditions may require us to alter the manner in which we determine our information needs, as well as, how we collect, analyze and present relevant information.

To set the stage for this discussion, let me just tell you a brief story. It takes place in 1942 in the middle of the Pacific Ocean.

According to the authors of the book Miracle at Midway, the U.S. Chief of Combat Intelligence, Commander Joseph Rochefort, knew within 300 to 400 miles where most Japanese ships were located. Each day, he reported what he knew to Captain Edwin T. Layton who handled Intelligence for Admiral Nimitz. But Layton, whose early warnings of the attack on Pearl Harbor went unheeded, consistently inflated Rochefort's estimates. He knew full-well that the folks in Operations viewed the Intelligence types as natural-born alarmists. So if Rochefort estimated four Japanese carriers were on the prowl, Layton would increase the number to six. He bet on the fact that Naval Operations would presume that he had over-estimated everything by at least a third. In essence, he believed that because Operations felt so strongly about their assumptions relative to "Intelligence types", they would discount by an equal amount his inflated estimates, and through this roundabout route come back to the original Rochefort estimate.

The question is, was there a problem in communication of information here? And, if there was, who was at fault? Was it Layton for not convincing the "Operations Officers" of what the "real" estimates were? Or, was it the "Operations Officers" who did not take the time to reconcile their beliefs with the assessments of the Intelligence community? Well, although none of them performed to the level of competence that one might have expected, they were all loyal and competent. Not one of them wanted to make the wrong decision. So, what was going on here?

In this instance, these officers faced an almost invisible enemy called personal bias. That is, the distortions that occur because of human fallibility in dealing with the collection, processing and use of information.

Why does this happen? The participants in 1942 had a fairly straightforward assignment:

> Predict the enemy strength, geographic location and where the Japanese high command would attempt to lure the U.S. Pacific Fleet into a naval battle that would lead to the virtual destruction of a U.S. naval presence in the Pacific.

But, in this instance, each of the players had a different set of beliefs concerning the task environment and his representation of it; that is, how he perceived the judgmental task.

The different perspectives between Layton and the Operation Officers dramatize this point:

> Because of his traumatic experience of having his consistent and early warning of the attack on Pearl Harbor go unheeded, Layton believed he needed to "trick" the Operations officers into accepting the assessment of enemy strength made by Rochefort -- which led him to take the action of inflating Rochefort's assessment.
>
> The Operations officers, probably looking for evidence that Layton's Pearl Harbor prediction of the Japanese attack was simply by chance, found it easy to believe that Layton was an alarmist. Indeed, because of his scheme which led to his "trick" approach, every time they reduced his estimate -- and had the ability to confirm the estimate -- their reduced estimate was proven to be correct. So, their individual perceptions of the task environment confirmed each other's opinion of the other.

You and I see this "Catch 22" happening every day. I would argue that a fairly good analogy to the relationship between Layton and the Operations officers would be a divisional product planner and a corporate review staff, or perhaps a governmental agency's program manager and an Office of Management and Budget analyst.

Of course, this whole issue of seeing what we want to see in the processing of complex information is not new. In Plato's Republic, there is an allegory about a cave, where the acquisition of human knowledge is likened to the shadows and reflections seen on cave walls. People and objects passing outside the cave may have different appearances because of the way the light shines into the cave at any given point in time.

For people sitting inside the closed walls of the cave, it would be naive to interpret the shadows as the real world.

Today, that message is still relevant. While we strive to move closer to reality, our knowledge is based on our understanding of the images or reflections we see. But the systems we rely on today -- systems that support decision-making, like the cave images, can provide no more than a reflection of reality.

Indeed, that leads to another question that needs to be addressed. How good is the reflection of reality that is provided by the information systems which drive most data collection activities of both the private and public sectors?

Recently, a distinguished group of scholars reported to the White House Office of Science and Technology Policy and the National Science Foundation their findings on decision-making and problem solving. Among other things, the panel focused considerable attention on what it refers to as the theory of subjective expected utility (SEU) which they identify as "central to the body of knowledge about decision-making..." The panel pointed out that this sophisticated mathematical model, and all of the assumptions under which it operates, underlies the basis for most contemporary economics, theoretical statistics and operations research.

Some of the critical assumptions underlying the SEU theory surfaced when the panel pointed out that SEU assumes that when making decisions, individuals and firms always choose to make themselves as well off as possible in a world where they know, without any doubts, everything that will happen. Moreover, if there is any doubt, it can be understood in very exact and clear terms.

Furthermore, the panel, given an earlier distinction between problem solving and decision-making, makes it clear that the SEU theory is associated with decision-making and has nothing to do with the components of problem solving -- how to frame problems, set goals, or develop new alternatives. The panel went further to point out that "...empirical research that shows how people actually make decisions...and research on the processes people use to solve problems..." has been used to complement SEU. Of importance to this morning's discussion, however, is that this empirical research has led to a descriptive theory which raises significant questions about the limitation of the prescriptive theory.

> "What chiefly distinguishes the empirical research on decision-making and problem solving from the prescriptive approaches derived from SEU theory is the attention that the former gives to the limits on human rationality. These limits are imposed by the complexity of the world in which we live, the incompleteness and inadequacy of human knowledge, the inconsistencies of individual preference and belief, the conflicts of value among people and groups of people, and the inadequacy of the computation we can carry out, even with the aid of the most powerful computers."

The panel then pointed out:

> "The descriptive theory of problem solving and decision making is centrally concerned with how people cut problems down to size; how they apply approximate...techniques to handle complexity that cannot be handled exactly."

Of course, to anyone who does problem solving or decision-making, this is not new news. What should be of interest to this committee, however, is the extent to which we, as a society, have accepted the unrealistic belief system which underlies the SEU theory which the panel identified underlies the basis for most contemporary economics, theoretical statistics and operations research.

The importance of this issue is brought home by psychologist Robin Hogarth, who has also spoken on the use of knowledge. In referring to what he calls the second industrial revolution -- propelled by information rather than steam, Hogarth says:

> "The new revolution is being propelled by information. And, as in the first revolution, relative success will be determined by the ability to handle the propelling force. . . There can be little doubt that the need today is for conceptual skills, that is, the ability to process information and make judgments."

Out of his work comes the notion that the real problem is to design organizational information systems that accommodate the fallibilities of human decision making.

I believe Hogarth is right. Now, let me return to my earlier observation that " government should play an important role in helping public and private policy makers create and use an information base for this country that will allow them to better understand -- and thus help society adjust to -- the transformation that is taking place as we move to a global economy " The action step is to "take a leadership role in reviewing how changing conditions may require us to alter the manner in which we determine our information needs, as well as, how we collect, analyze and present relevant information." In essence, we must make sure we have a Federal Statistical System which is prepared to deal with the realities of the world we will be facing in the 1990's and the 21st Century.

In other forums, I have suggested this should be the role and responsibility of the Chief Information Officer (CIO) of the United States. This proposed position is not limited to the functions found in the existing role of the Chief Statistician within the Office of Management and Budget. Nor should this concept be limited to a set of statistical policy issues focused around the question, "Are we doing things right?" <u>The job of the CIO is directed at the complementary question, "Are we doing the right things?"</u>

In today's more complex environment, we must have someone -- properly chartered and supported -- who will have the authority and responsibility to bring together the providers <u>and</u> users of government statistical information to address these fundamental questions.

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It should also be noted that this is not a one person job! However, this function does not require, nor should it be allowed to create, a new bureaucracy. The scope of the CIO's responsibility should extend to all applicable, statistically-based, information activities conducted in the Executive Branch of the Federal Government. To fulfill this role, the CIO would need to be assigned, through appropriate legislation, both direct line and functional authority.

Under line authority, the CIO would have a relatively small staff of high level experienced specialists to assist in the management of statistical functions (primarily substantive rather than administrative) that are conducted across departments and who would also be able to provide advice and counsel to the decentralized units in the conduct of their activity, including budget coordination. The staff should be large enough to get the policy and coordination accomplished, but not large enough to believe it can do the work of the departmental statistical units.

Within this arrangement, we still need a Chief Statistician. This person would be working within the office of the CIO, would address a continuous agenda of work involving information quality, reduction of bias, methods of collection, peer-group review and public scrutiny, integrity of reporting and dissemination, etc.

Under functional authority, the CIO should have:

> Considerable input into the selection of the individuals in key positions in the departmental statistical units, and other units of government where statistical activities are performed.
>
> The ability to contribute, where applicable, to the position descriptions, as well as, the performance appraisals of key personnel throughout the statistical information system.
>
> The responsibility and authority to manage the career paths of all senior government officials involved in the statistical system in order to provide senior statistical personnel broad governmental experience. (Political appointees obviously would be excluded from this authority.).

It would be the CIO's principal assignment to ensure that the statistical agencies are never relegated to a narrow reactive function of providing limited information sets to the decision process. The CIO would also be expected to encourage these agencies to establish a more proactive concept for developing a productive dialogue between provider and user.

Let me hasten to add that I understand the professional concerns that are often raised when we talk about getting the providers and the users closer together.

The information providers see the importance of the linkage with the information users. But many, understandably, prefer arms-length transactions, rather than close encounters, with policy makers and political officials. The main worry of the providers is the potential for manipulation of information production and dissemination -- and there is some historical precedent for their concern.

Indeed, a former colleague at the Census Bureau, Ted Clemence, once noted somewhat wryly, that the only way for the Federal statistician to function wholly apart from the political process is to be irrelevant -- and there is some historical precedent for that, too!

Be assured, I am not talking about creating a "statistical" or "information" Czar who omnipotently knows exactly what people ought to need, or what customers ought to value. Granted, there is always the chance that putting more power in someone's hands can lead to abuse. But what are the rewards relative to that risk? What is the risk of not taking any action? If we do nothing to improve things organizationally out of fear, we are, in essence saying we are more worried about protecting ourselves from the possible misuse of power than we are about the misuse of knowledge that stems from inadequate information systems. This is noteworthy because the latter -- a concern reflected by the creation of this new committee -- has actually occurred, while the former is only a possibility that can be minimized by developing appropriate safeguards.

For example, a position of the CIO should be created as a Presidential appointment with Senate confirmation, and with a four-year term (perhaps timed to overlap administrations). Presidential and Congressional appointments to a public Advisory Committee that would issue an annual report to the Congress would provide an additional safeguard.

Mr. Chairman, you have noted that information is a valuable resource we need to utilize if we are to be competitive in the new global economy. I agree, and would like to make sure we understand that answers to our current situation are not found in improving the manner in which we gather information alone. Although accurate and timely information is critical, competitive advantage is not gained solely by collecting information better than anyone else. Competitive advantage is gained by getting users and providers together to ensure we have better information that we can use better than everyone else!

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TESTIMONY OF ROBERT L. PARK
DIRECTOR OF THE OFFICE OF PUBLIC AFFAIRS
OF THE AMERICAN PHYSICAL SOCIETY

BEFORE THE SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS
SUBCOMMITTEE ON GOVERNMENT INFORMATION AND REGULATION

FEDERAL POLICY ON SCIENTIFIC INFORMATION

May 15, 1989

Mr. Chairman and Members of the Committee:

I appreciate this opportunity to express the deep concern of the American Physical Society over impediments to the free exchange of scientific information. The American Physical Society is the leading organization of physicists in the United States, with about 40,000 members in university, industry and government laboratories. About 4,000 members reside outside the United States. The purpose of the Society is to advance physics through the publication of journals and the organization of meetings for the exchange of scientific information. In 1988, the Society published more than 60,000 pages of scientific papers and held or sponsored 35 scientific meetings.

President James Madison wrote that, "Knowledge will forever govern ignorance, and a people who mean to be their own governors must arm themselves with the power that knowledge gives."

You might ask the folks around Fernald, Ohio. Fernald, a town most of us had never heard of until a few months ago, is part of a ghastly radioactive contamination scandal involving the sixteen plants of the nation's nuclear weapons production complex, stretching from Richland, Washington, to Pinellas, Florida. These plants, operated by civilian contractors, have covered up shoddy environmental and safety practices for decades. The health of thousands has been jeopardized; the eventual cleanup and replacement costs have been estimated to be in excess of $100 billion. How could it have gone so far without anyone objecting? In an industry that operates entirely behind the curtain of government secrecy, it was easy, and perhaps inevitable.

Few in today's world would argue with the need for governments to guard certain information closely. A government has a responsibility to ensure the privacy of its citizens, protect intellectual property, and withhold information that might endanger national security or hinder international diplomacy. Every government soon discovers, however, that a license to keep secrets has a variety of uses; not all secrets are intended to make the nation more secure or protect the rights of its citizens.

Behind the curtain of official secrecy, erroneous information goes unchallenged; waste, corruption and foolishness are concealed from the public; secrets are selectively leaked for political or financial advantage; the threat of revealing classified information in the courtroom is used to avoid prosecution. Society is well advised to grant the license to hold secrets sparingly.

A thirty-year trend toward less secrecy, however, was abruptly reversed in 1982, when President Reagan issued Executive Order 12356, establishing new rules for the classification of national security information. The new policy could be paraphrased as, "when in doubt, classify." And classify they did--more than a million documents in 1982 alone. "When everything is secret," someone once said, "nothing is secret."

We believe the rules for classification of national security information should be reviewed and we should move the nation back in the direction of greater security for less information.

But it was the Carter Administration that first began experimenting with controls on unclassified information. The mechanism for such controls was the Export Administration Act of 1979. Prior to 1979, export restrictions had applied almost exclusively to actual strategic goods, but it was argued that it would be more effective to deny our opponents the information needed to produce their own strategic goods. This led to the concept of "sensitive but unclassified" information--like inferior wine, it was approved for domestic consumption, but barred from export.

Alas, information cannot be only a little bit secret. If we bar the export of information to the Soviet Union, does it make any sense to allow Soviets or their agents to obtain the same information through the Freedom of Information Act? And, if we deny FOIA requests for the information, surely we cannot allow it to be presented at conferences that these people might attend, or placed on library shelves to which they have access, or included in commercial databases to which they could subscribe.

Inevitably then, efforts to prevent information from being transferred abroad led to measures to prevent its disclosure at home. In certain fields, the government sought to bar foreigners from unclassified scientific conferences; authors were pressured to withdraw unclassified research papers; "voluntary" agreements to submit manuscripts for prepublication review were obtained; foreigners were barred from participating in unclassified research projects.

We believe Congress should move to eliminate all restraints on the dissemination of unclassified information from the export control laws.

The unified opposition of the scientific and technical community to these measures did lead Congress to soften controls on information in the revised Export Administration Act of 1985. The Reagan Administration also appeared to back down, declaring that "our goal is to maintain the free and open exchange of information so necessary to a free society and an expanding economy." Indeed, interference with technical conferences and publications abated. But, the beast had not been driven off, it had simply changed form.

In 1987, the public first became aware of a pattern of FBI visits to science libraries in an attempt to recruit librarians as informants. In defending this violation of the sanctity of the library, the new FBI Director, William Sessions, explained to a Senate Committee that Soviets or their agents might seek access to the National Technical Information Service, an electronic database that can be accessed on-line through many university libraries. It is merely a collection of unclassified reports of government-sponsored research. But according to a report released by Mr. Sessions, the Soviets were "embargoed from directly accessing materials through NTIS" by a January 8, 1980, directive from President Carter.

The FBI is mistaken. The Carter memorandum does not mention NTIS, nor does it even indirectly apply to NTIS. It directed the Secretary of Commerce to suspend all validated export licenses to the Soviet Union for goods or data pending review of whether these licenses should be indefinitely suspended or revoked in light of the Soviet intervention in Afghanistan. Since all NTIS technical information is openly published material, it qualified for a general export license. Moreover, the Carter memorandum is no longer in effect and has not been for years. Under Section 6 of the Export Administration Act, controls maintained for foreign policy purposes require annual extension, and the Carter memorandum has never been extended.

An unclassified electronic data base service operated by NASA is also available to universities, but a contract provision bars foreigners from using the system. Since most universities are both unable and unwilling to distinguish foreign users, they do not subscribe to the service. Once again, an attempt to deny "sensitive" information to our opponents has made it inaccessible to everyone.

Why is the government so concerned with electronic databases that contain only material that is culled from public sources? The security zealots are terrified of the power of the computer to piece together sensitive information from a large number of public sources. That fear is evident in an initially secret directive issued by President Reagan in 1984. NSDD 145, National Policy on Telecommunications and Automated Information Systems, sought to extend federal controls to include "sensitive nongovernment

information" in commercial databases. Congress has since blunted the impact of that directive, but the attitude it reveals is frightening.

We are fast approaching the day when electronic databases will largely supplant conventional libraries as the repositories of scientific and technical information and will become the preferred means by which scientists communicate their findings. To persist in an attempt to constrain this electronic revolution is to ensure that other nations will take the lead in shaping the future.

We believe electronic databases should be assured of the same protection under the First Amendment as the printed word.

And now, as cold war tensions give way to concern over our competitive failure, the notion of "sensitive" information has been expanded even further to include "commercially valuable" information. The chauvinism that once attributed every Soviet advance to technology purloined from the West now seeks an explanation for our competitive failure in the myth of a one-sided flow of technical secrets to the Pacific Rim. The final days of the last Congress saw the introduction of a flood of legislation intended to reverse our competitive slide by erecting new barriers to the flow of scientific and technical information and by forging links between industry, government laboratories and universities.

One specific goal of these legislative proposals is to exempt "commercially valuable" information from requests under the Freedom of Information Act. Attempts to emasculate the FOIA are nothing new--they come up every year--and in 1984 Congress granted an exemption to the Defense Department for information covered by export restrictions. NASA has unsuccessfully sought a similar exemption, claiming at one point that the Japanese had used the law to obtain complete design details for the Space Shuttle. A review of NASA records, however, revealed that the only shuttle document supplied in response to a Japanese request was a glossary of terms.

We believe the Freedom of Information Act should be protected from any further erosion.

But a more insidious threat to the traditional openness of American science lies in the increasing emphasis on commercialization of academic research. University administrators see these new industrial links both as a source of scarce funds and as evidence to state legislatures that universities are a good investment. The government sees it as a way to get off the hook for their failure to sustain adequate funding for research. Industries that have failed to maintain an investment in research see it as way to get their research done for them on the

cheap. In this climate, universities are accepting restrictive clauses in agreements with industry that they would have indignantly refused in a federal contract a few years earlier.

We believe universities should be as unwilling to accept contracts from the private sector that dictate the conduct or reporting of research, as they are (or should be) from the federal government.

Finally, the growing commercial entanglements of universities and faculty, which are encouraged by federal policies, are weakening the emphasis on professional reputation that once ensured a culture of openness. Universities play a vital role in the nation's economic health, but it is the long-range role of training new scientists and providing the scientific base for the products of the future.

In recent weeks there has been a flurry of activity following an announcement by the University of Utah that two researchers had produced "cold fusion" in a simple laboratory experiment. Normally such an announcement would have been preceded by a careful review within the scientific community, and a detailed technical report would have been available to other researchers. Neither happened.

This was more than a breech of etiquette. The details were needed to enable other scientists to confirm the experiment. This departure from accepted scientific standards was motivated by the University's desire for commercial exploitation. While still lacking confirmation, the University sought federal funds to develop cold fusion technology. It now appears that the Utah announcement was in error.

It is not unusual for respected scientists to be misled at times by unexpected flaws in their scientific instruments or procedures. It is for that reason that scientists are expected to expose each new advance to the impartial scrutiny of skeptical colleagues. The cold fusion episode has been an object lesson on why these established procedures should be adhered to, and why science flourishes only in the open.

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Statement of

Courtenay Slater
Chairman, Slater Hall Information Products

to the

Subcommittee on Government Information and Regulation
Committee on Governmental Affairs
United States Senate

May 15, 1989

I appreciate the opportunity to appear before this Subcommittee and present my views on the federal statistical program and how it might be strengthened. I should note that these are my personal views and not necessarily those of the Council of Professional Associations on Federal Statistics or of any other organizations with which I am involved.

I should like to begin by welcoming the formation of this Subcommittee and the vigor and expedition with which it is addressing its mandate. Such a locus within the Congress for consideration of information policy, including statistical policy, has been much-needed.

This improved congressional structure appears to be matched by a new interest within the Executive Branch in taking steps to strengthen the statistical program. President Bush

highlighted the need for improved statistics in his budget message. OMB now has in place a Chief Statistician, and he is addressing his responsibilities with skill and energy. The Chairman of the Council of Economic Advisers is chairing a newly established Economic Policy Council Working Group on Economic Statistics.

In short, the present moment may present the best opportunity in some years to achieve significant improvements in the coordinating framework for the federal statistical program and to eliminate some well-meant but unproductive over-regulation of statistical agency management.

I should like first to provide some description of the problems with the statistical program as I see them and then offer some specific suggestions for legislative components of the solution.

The task of providing meaningful and adequately-complete quantitative measures of our changing economy and society is formidable. Our statistical agencies have not found themselves able to keep up. This is not because our statistical programs are bad or our statisticians incompetent. Quite the contrary. We in the United States are extraordinarily fortunate in having capable, dedicated statistical personnel and a large complement of objective,

professionally-prepared statistical information. It is the complex and ever-changing nature of the economy and society we are trying to measure that makes it so hard to provide relevant statistics.

Let me give just two examples.

1. Internationalization of the economy. Not only has the volume of U.S. merchandise imports increased dramatically, creating well-publicized problems for our antiquated system of import documentation, but international flows of services, investment capital, and human beings have increased at a dizzying pace. The problems of measuring merchandise trade pale when compared with those of obtaining reliable estimates of these other aspects of our international position.

What constitutes foreign ownership of U.S. productive facilities?

How much unrecorded (and often illegal) cash flows into and out of the United States?

How many foreign workers enter and leave? More important, what role do they play in our economy? Are they productive workers making a vital contribution to an otherwise labor-short economy? Are they an

alternative to further movement of U.S. manufacturing to lower-wage countries? Or are they just taking jobs away from U.S. citizens and overburdening social welfare programs?

The policy relevance of questions such as these is obvious enough. Not only the data but the statistical concepts needed to provide the answers often are sorely lacking. Lack of reliable official information leaves the door open to circulation of misinformation from non-government sources. Policy formulation is adversely affected.

Our statistics about foreign trade and finance are no worse than they used to be -- in some respects they are better -- but our need for information in this and other areas has grown enormously more important and more complex.

2. Changing industrial structure. It is well-recognized that we have shifted from a predominantly goods-producing to a predominantly service economy and that our statistics, despite some valiant efforts, have not fully kept pace. But this statement disguises the complexity of the problem.

The problem starts with definitions for new kinds of business activity. What is a good? What is a service? Computer software, for example, is classified as a service in the Standard Industrial Classification (SIC) code. Yet mass-produced software seems to me to fully meet the traditional definition of a manufactured good.

My own business, to take another example, involves placing statistical data and retrieval software on optical discs (CD-ROM). CD-ROM has emerged as an industry -- potentially a major one -- only in the past two years. It has no separate SIC code and hence no good standard measure of its growth.

Multiply this example by the many thousands of new "high tech" firms that emerge each year and the inadequacy of our statistical definitional categories becomes apparent. The revised SIC code now at last being implemented will help, but not nearly enough.

The businesses growing up around new technology are structured differently than old-line manufacturing industries. They often start out small, requiring little capital investment. Some blossom rapidly into industry leaders (Apple, Lotus, Microsoft, and Compaq, for example); some become prosperous small businesses;

> others disappear as quickly as they came. How can we analyze questions of entrepreneurial behavior, industrial structure, and international competitiveness when we cannot even categorize and measure these new firms; when whole new industries evolve in between economic censuses and in between revisions in the SIC code?

One could go on and on with the list of economic changes that need measurement and understanding: the increased labor force participation of women; changes in communciation and transportation; growth of the underground economy.

The inherent challenges of keeping statistical pace with economic change are great. The ability of statistical agencies to respond has been hampered not only by inadequate budgets but by a complex set of bureaucratic stumbling blocks and above all by lack of central coordination and of priority attention at the top levels of government.

The director of a statistical agency faces not only a budget ceiling but also a personnel ceiling, an Information Collection Budget ceiling, and a mind-boggling array of regulations pertaining to hiring, procurement and virtually every other aspect of program management. These regulations have been established in pursuit of important public policy

goals. Taken altogether, however, they impose substantial inefficiencies on government programs. In these days of fiscal stringency, we need to stretch the taxpayers' dollars as far as they will go. This means finding ways to give program managers greater flexibility to use available funds in the most efficient way.

In particular, I hope this Committee will take a close look at the Information Collection Budget and the ways in which respondent burden is measured. The present measurement system makes no distinction, for example, between respondent "burden" imposed on individuals and on businesses. There is abundant evidence that individuals, as opposed to businesses, do not generally regard responding to statistical queries as a burden. Neither businesses nor individuals regard statistical queries as anything like the same sort of burden as, say, tax forms.

The "burden" totals reported by OMB based on the present Information Collection Budget are not meaningful. Indeed, they are misleading, and ~~there~~ their effect is mischievous. Intentionally or not, they seem designed to document alleged progress in reducing the paperwork burden imposed by the government on the public. In fact, it seems doubtful that any such progress exists. I very much doubt that the public

feels 10 or 15 or 25 percent less burdened with paperwork today than ten years ago.

If we are serious about wanting to reduce paperwork, Information Collection Budgets and annual percent reduction requirements should be abandoned in favor of more meaningful approaches. Two especially fruitful areas would be further efforts to simplify tax forms -- by all odds the most onerous public reporting burden -- and similar efforts to simplify Medicare forms -- a particularly difficult type of paperwork imposed on the elderly.

Statistical collections represent only a tiny fraction of the total paperwork the government requires of individuals. It does not follow, however, that we should be cavalier or unconcerned about statistical reporting burden. We should take effective actions to contain it. Again, we should forget the window-dressing of the Information Collection Budget and concentrate attention on efforts such as better forms design; computer-assisted interviewing; and increased statistical use of "administrative records", that is, of information that is collected anyway to meet program management needs.

Steps such as these should not only reduce reporting burden but should result in better data. Progress will be most

rapid if there is close coordination among agencies. Research on forms design, interviewing techniques, and the like could be conducted jointly by statistical agencies to a greater extent than at present. Very particularly, better statistical use of administrative records requires inter-agency cooperation, since the agency collecting the information often will not be the one producing the statistics, and, indeed, typically will not be a statistical agency at all. The need for coordination thus goes well beyond cooperation among the statistical agencies themselves.

It follows that our decentralized statistical program requires a strong coordination mechanism to make it work well. Even if we had a central statistical agency (which I do not advocate), there would be important needs for coordination with non-statistical agencies that are sources of administrative records.

Experience of the past 15 years has demonstrated the need for the statistical coordinating mechanism to be firmly established in law. The authority and responsibility for statistical coordination has long been so established. But the then-existing laws left OMB free to progressively reduce the resources and authority of its statistical policy office during the 1970s and the President free to transfer it to the Department of Commerce in 1977.

The original Paperwork Reduction Act of 1980 transferred statistical policy back to OMB, placing it within the Office on Information and Regulatory Affairs (OIRA). The placement in OIRA was unfortunate, and total extinction of any identifiable statistical policy staff by an Administration far more concerned with questions of regulation and deregulation was only narrowly averted.

The position of Chief Statistician has subsequently been established by law, but staffing of this function remains woefully inadequate, and OIRA is still the wrong place for this function.

Legislation that renews or replaces the Paperwork Reduction Act should maintain the statistical policy and coordination authority and responsibility contained in Section 3504(d) of the present law. But I would suggest that these responsibilities should be removed from OIRA and placed in a separate office headed by a Chief Statistician reporting to the Director of OMB. Given OMB's track record over the past decade, this office should be explicitly established by law. The law should require that this office be headed by an individual with appropriate professional experience and that the office be adequately staffed.

This organizational change would accomplish several things.

1. It would elevate the statistical policy function in seniority and visibility, giving it the authority needed to deal effectively with agency heads and place it more nearly on a par with counterparts in other countries with whom the United States must cooperate on statistical endeavors.

2. It would remove statistical policy from OIRA, where it is not only subject to neglect but where it easily becomes confused in the public perception with collection of information for regulatory purposes.

3. It would facilitate the ability of the statistical policy staff to work closely not only with forms clearance staff in what is now OIRA but also with budget examiners elsewhere in OMB.

This fairly simple change in current law would do much to lay the foundation for improved management and coordination of the federal statistical program.

In closing, I would like to make one broader comment on legislative needs. In this Committee's consideration of renewal or replacement of the Paperwork Reduction Act, the

current law should be reviewed from the viewpoint of its adequacy in fulfilling the government's affirmative responsibility to provide public information as well as from the viewpoint of reducing paperwork. This perspective would be more easily achieved if we could begin discussing the "Public Information Act" or the "Information Policy Act" rather than the Paperwork Reduction Act. Whatever the name, the law's statement of purpose should begin with the affirmative responsibility of government to supply honest, accurate and relevant information for necessary public purposes rather than with the more negative considerations of minimizing paperwork and minimizing costs. The latter are important, but they are meaningful only as they relate to proper administration and coordination of activities intended to fulfill the important public purpose of supplying information.

The specific suggestions I have made for strengthening statistical policy coordination are not the only alternative. Others may have better suggestions. I want to conclude by underscoring my view that legislative action is needed in this important area and that legislation should be considered in the context of information policy, not just of paperwork reduction.

Thank you for the opportunity to testify.

STATEMENT

OF

Christopher T. Cross

Vice Chairman
Macro Systems, Inc.

Before The Subcommittee On Government
Information and Regulation

U.S. Senate Committee on Governmental Affairs

May 15, 1989

Mr. Chairman, Members of the subcommittee, good morning. It is an honor to be asked to appear before this new subcommittee to address issues about whether the Federal government is directing its efforts to collect the right education information and, given our tradition of local control of schools, where are the critical areas in which the Federal government should concentrate its effort. I would also like to address the topic of information dissemination. Unless we deal with getting information to the right people at the right time, simply focusing on the collection side of the equation will not be terribly productive.

To give you some perspective on my own interests in this area, I have spent the past 20 years in the Federal education policy field. During the 1970s, I served as the deputy assistant secretary for education legislation in HEW and as Republican staff director and senior education consultant to the Republican Members of the House Committee on Education and Labor. During the 1980s, I served as an advisor and consultant to the Education Department on subjects ranging from student aid reform, to developing cooperative systems for collecting elementary and secondary education data. Most recently, I have been serving as the chairman of a panel to advise the Assistant Secretary for Educational Research and Improvement on matters affecting operations of the nine regional educational laboratories.

Educational Reform Demands Timely Information

Let me begin by noting that in the past decade or so, education has become an area of enormous concern to citizens and policymakers in virtually every area of

this country. Significant reforms have been enacted in most states, and the movement to achieve real reform in our schools has become a significant element of political life at all levels of government.

For ordinary citizens, policymakers, and educators, it is critical to have good, accurate, current data. Until the middle of this decade, both Congress and the Executive branch failed to recognize the importance of providing the financial support and leadership which is necessary for this vital function. Thankfully, for the past 4 years or so, the recognition is there, although I am not certain there is will on either side to actually make good on the already-made commitments, to say nothing of completing the work that must be done.

For example, the 100th Congress made a commitment to expand the National Assessment of Educational Progress (NAEP), to include pilot studies of math and science at the state level. That commitment implies more than doubling the NAEP budget to $20 million by 1993.

Other longitudinal studies that have already been started or are planned would increase the data collection budget for the National Center for Educational Statistics (NCES) alone by over $6 million in this same time period. There is scant evidence that neither Congress nor the Administration understands the depth of the commitments that have been made.

Education Indicators Panel Mandated

Other areas within NCES also merit attention. For example, in Public Law 100-297, Congress mandated appointing a panel to study and issue a report on education indicators. That law was signed over a year ago and, to date, the Center has been unable to appoint members of the panel due to objections from other areas of the department. This is the sort of interference that is a major problem when establishing new data systems and obtaining outside advice. The problem in this instance stems from the fact that the panel falls under the Federal Advisory

Committee Act (FACA). That has meant countless delays and endless bickering because of the authority that FACA gives to other parts of the department.

A similar set of problems affect several other provisions of Public Law 100-297. For example, the authority given the NCES Commissioner to publish reports, appoint staff, and arrange contracting authority has been similarly blocked. In this regard, I commend to your attention a recent letter sent by Representative Obey to Secretary Cavazos on these matters.

The point of all of this is that we simply cannot continue handcuffing units of government that provide information and data with the same kinds of bureaucratic red tape that is forced on other parts of the government. Organizations like OERI and NCES must be free to seek advice and publish reports. They must also be able to hire staff and get contracts approved in shorter time periods than agencies normally require, until agencies personnel and contract officers reform their own practices to meet the needs of their clients, rather than serving as barriers to prompt and effective action.

Government Needs To Expand Its Definition Of Education

Regarding education data collection, it is essential that the responsible units of the department be capable of constant change. They must be able to respond to the needs of information users, to factor in the latest findings, and to take advantage of the newest technologies. To do less is to deprive the public of the level of service they must have and, indeed, are paying for.

There are several areas where I do believe we still need to broaden our sights. For example, the Department of Education still tends to think of itself as the agency of traditional education providers, when there are, in fact, many instances where a great deal of education goes on outside of traditional school walls. For example, I am told that in Flint, Michigan, GM operates a school in the plant that allows GM workers to earn a high school equivalency.

In many parts of the country, banks and insurance companies are investing heavily in teaching basic skills to new and perspective employees. Other kinds of businesses are making similar investments. Across the country, hundreds of thousands of nonschool-age adults are enrolled in government-sponsored job training programs, many of which focus a great deal of attention on teaching basic and social skills, as well as the other skills required to hold even the most minimal job.

By not including these programs in their data collection efforts, due, I am certain, to cost as well as philosophical considerations, the Department of Education is simply not seeing the full picture of what goes on out there that fits a realistic, 1989-style definition of education.

Eliminate Overlap In Data Collection

We also need to pay even greater attention to collecting information about student performance. The changes in NAEP I mentioned earlier will be a major step in that direction. Even that is only a pilot, and it deals only with math and science. If we are to take these matters seriously, then we really do need much more data, collected more often and at a much lower aggregation level. Currently, NAEP data is valid at the regional level only. Even after the math/science pilot, it will only be valid at the state level. And, of course, we must balance that objective with the fact that education is still a state function. Hence, legitimate concerns are raised about efforts that may seem to be pushing us in the direction of a national curriculum.

Another area I believe we need to look at is the proliferation and overlap among data collection efforts. We view NCES as the main data collection unit of the department. It probably collects far less than half the total data just within that one department. Data is collected by virtually every program office, the Office for Civil Rights, and the Office of Planning, Budget and Evaluation. It is understandable that all too often overlap and conflict arise out of these data collection efforts, and the beleaguered data provider may simply be overwhelmed by all these requests.

When you add to this the data collection efforts of NSF, Census, Ag, and other agencies, it is easy to understand why the data provider at the local level may feel they give a lot, and get little in return.

Timely Information Dissemination is Critical

I also would like to address information dissemination. The best, most accurate information is of little help to anyone if it is not made available in a timely manner, through available channels for the user. While the Department, and particularly NCES, has taken many steps to improve access to data, much more can be done, especially to make certain that information is available to parents, teachers, and local policymakers. This might include having the latest data available through public networks like the Source, as well as professional networks like Dialogue. It might also mean equipping public and university libraries with the most current statistics and providing a user/consumer information hotline that uses the fax machine to get information to requestors almost instantaneously. It may also mean allowing data to be downloaded to home personal computers, so parents and teachers can study and analyze it.

A Blue Ribbon Commission Is Needed

Finally, I would like to make a recommendation to the subcommittee.

The advocation information and research system existing today was first conceived nearly 25 years ago, under the Cooperative Research Act of 1964 and the Elementary and Secondary Education Act of 1965.

At that time there wasn't the variety of other information, research, and technical assistance providers that exist today. In addition, during the past quarter of a century, the Federal government has created an increasingly complex series of intermediary and research organizations like the Chapter 1 Technical Assistance Centers, the ERIC Centers, and a series of research centers. Today, we do not have a research, development, and dissemination system in education; we have a

hodgepodge of data collection and research efforts, development schemes, and dissemination providers.

In addition, with the technological advances of the past two decades, we can communicate by electronics almost instantaneously. Every day, we use millions of microcomputers in homes, offices, schools, and private organizations to obtain, study, and analyze datasets that in the 1960s, used to require trained scientists and engineers to access large computers for the same information.

We also have a society where people get more information from non-printed sources than from the printed word, and where desktop publishing has made it possible for sophisticated printing to exist anywhere.

In short, I suggest the time has come for Congress and the Administration to take the initiative to design a new education research, development, and dissemination strategy for the 1990s and the 21st century. To do so, I suggest they authorize the appointment of a blue- ribbon commission to study the problem and make recommendations to guide this area's development for the next quarter century.

I suggest that the National Research Council, of the National Academy of Sciences, be asked to convene such a panel and that it include representatives of the current system (labs, centers, ERIC, etc.), as well as those who might bring some new thought and direction to the topic. I estimate that the work of such a panel might cost roughly $1 million. It is a small investment, when you consider the hundreds of billions of dollars we spend each year on education, and how each of us needs to make better use of available information.

I hope that these comments are helpful to the subcommittee. I would be happy to answer any questions.

SENATOR TOM DASCHLE

Statement on Information Policy

Before the Subcommittee on Government Information and Regulation

May 15, 1989

Mr. Chairman, and members of the Subcommittee, I appreciate this opportunity to express my thoughts on the state of federal information policy. There is a natural tendency to undervalue the importance of this somewhat esoteric issue, and I commend you for recognizing its far-reaching implications.

Electronic technology is clearly one of the most dynamic aspects of modern life in the United States. There is, perhaps, no area that has been more affected by this technology than the gathering and dissemination of information. Currently, our capacity to gather and disseminate information is truely staggering, and there seem to be few limits to future advancement in this area.

Our present capabilities and the future possibilities make it imperative that policy-makers involve themselves in the process of determining how information technology will be used. This does not mean that we in Congress should plan the future development of the information industry; that would be counterproductive. But, Congress and the Executive Branch should have a vision, a philosophy, a set of principles to guide the development and use of electronic government information.

Our political history is unique among the nations of the world in the emphasis we have placed on the public's right to know. There is nothing more fundamental to our form of democracy than a well-informed public, receiving information from a free press and open governments. This is a tradition that must be continued, and, if possible, expanded.

The most important recent expression of this tradition was the passage of the Freedom of Information Act. This legislation established the principle that the public had a right of access to most kinds of government information. There are, of course, a number of problems with the Freedom of Information Act and its implementation, such as the timeliness of responses to requests for information, the costs associated with access to some kinds of information, the unnecessary classification of certain material, and others. But, the Freedom of Information Act has been a powerful and generally successful tool that the public has used to overcome the inclination of some agencies to withhold, hide, or otherwise obscure government information.

This subcommittee is responsible for reformulating another important law affecting federal information policy: The Paperwork Reduction Act of 1980. The basic purpose of this law was to reduce the paperwork burden on the American public, and to increase the usefulness of government information. The major means for achieving these goals was "improved management of information resources." In order to ensure that this improved management occurred the Office of Information and Regulatory Affairs (OIRA) was created within the Office of Management and Budget (OMB).

Since 1980, when OIRA was established, increased centralized control over information resources has had the predictable effect of expanding OMB's powers over federal agencies. But, this expanded power was not always used in ways envisioned by the authors of the Paperwork Reduction Act. Some valuable government publications and statistical series were terminated. There were several instances in which it appeared that, for political reasons, OMB was delaying the implementation of agency regulations, usually in the areas of health and safety and civil rights. In other cases, OMB changed the designs of federal studies, again, apparently for political purposes. Or, as we have recently heard with regard to global warming research, OMB has actually pressured scientists to change the results of studies.

This is the broad context in which the more specific issue of electronic information systems and public access to these systems must be examined. I am concerned about the way OMB has structured agency information systems. I am not convinced that the public's need to know and statutory mandates that agencies have to inform the public have always been given the priority they deserve. Instead, it appears that pursuing the goal of privatization of information dissemination and preventing agencies from competing in any way with private vendors of government information has often been the driving forces behind behind OIRA decisions.

I was introduced to this problem when the Governor of South Dakota, George Mickelson, encountered difficulties in using the Trade Leads service of the U.S. Department of Agriculture's (USDA) Electronic Dissemination of Information (EDI) system because of its cost. The dissemination of Trade Leads information, following OIRA guidelines, is reserved for private vendors. Trade Leads provides up to the minute information on inquiries from foreign buyers who are interested in purchasing U.S. agriculture and food products. The Governor viewed this information as a potential economic development tool for a state rich in agricultural products.

My reaction to the Governor's experience with Trade Leads was to question why users could not access this information through direct electronic connection with the federal agency that collected it. I found it difficult to understand why the public, which paid for the collection of this information through taxes, should have to pay a private firm to gain access to it.

Experience with Trade Leads and other USDA information services served to stimulate my interest in the federal government's information policy. I am concerned about several of the principles contained in Circular A-130 and its proposed revisions that guide the decisions of OIRA with regard to the collection and dissemination of government information by federal agencies

One such principle is that agencies should not offer electronic information dissemination services when such services are "available in the marketplace." I am not convinced that the mere presence of private sector vendors should rule out improved public access through appropriate agency dissemination services. There are many questions that should be asked about privatized dissemination, other than whether it exists. The reasonableness of the cost of the information service should be investigated. Also, the likely pattern of usage, in term of what kinds of individuals and groups will be able to pay for the information service, should be examined. It would seem essential to determine whether there would be competition among private vendors. Finally, the question of whether there would be a legitimate role for agency dissemination despite the presence of a private vendor(s) should be considered.

The proposed A-130 revisions also stress that government agencies should "avoid offering value-added products to end-users." Now that nearly every agency has computerized information systems, and given recent advances in electronic storage and retrieval capacity, the process of making information available via telephone wires and computers is simple and inexpensive. An electronic medium nearly always adds value to information because the mere organization of data in electronic format usually improves its value to users. I fear that, in some cases, the principal effect of the prohibition against government agencies adding value to the information they collect has been to protect the market privileges of private vendors at the expense of broad public access. I think efforts to meet the primary goal of widespread access to information should supercede efforts to avoid competition with private sector vendors.

Finally, I find the distinction that OIRA has maintained between access and dissemination to be exceedingly problematic in this age of computerized information and electronic communication. This distinction may be useful with regard to paperwork policy, but it makes little sense in the realm of electronic information systems. Arbitrarily applied distinctions only confuse the real issues. OIRA's policies should aim to satisfy the public need and statutory mandates for wide public access to information rather than treating

government information as if it were a purely commercial commodity.

I do not claim to know all the answers as to how to structure a policy to govern this complex area of government activity. However, I think that technology is constantly opening up new and exciting possibilities for having a better informed public, and I do not want the federal government to squander opportunities to inform because of rigid and unimaginative policies and practices. I think that if Congress, the Executive branch, and other interested groups can establish a constructive dialogue about how to best utilize new electronic technologies to provide the American people with government information that will be useful to them at a reasonable cost, an enlightened and effective information policy will almost certainly result.

I welcome the recent efforts made by OIRA officials to open discussions with congressional staff and outside groups. An atmosphere of openness and cooperation is necessary if the larger goal of improving federal information policies is to be realized. This hearing demonstrates that this Subcommittee, and Chairman Bingaman, will take the lead in developing government information policy as it deliberates the reauthorization of the Paperwork Reduction Act. Again, I want to commend the Subcommittee and its Chairman for undertaking this difficult but much needed task. I will give my fullest support to your effort.

Thank you.

NATIONAL SCIENCE FOUNDATION

Office of the Director

WASHINGTON, D.C. 20550

Notice No. 106 April 17, 1989

IMPORTANT NOTICE TO PRESIDENTS OF COLLEGES AND UNIVERSITIES AND HEADS OF OTHER NATIONAL SCIENCE FOUNDATION GRANTEE ORGANIZATIONS

SUBJECT: RESPONSIBILITIES OF INSTITUTIONS AND INVESTIGATORS IN THE CONDUCT OF RESEARCH

This Important Notice implements the major findings and recommendations contained in the National Science Board report "Openness of Scientific Communication" (NSB 88-215) approved in December 1988. The purposes of this Notice are: (1) to reaffirm NSF's commitment to open, rapid dissemination of research performed under its sponsorship, and (2) to strengthen policies and procedures to assure maximum openness of scientific and technical communication.

1. Open Scientific and Engineering Communication

The NSF advocates and encourages open scientific communication. The NSF expects significant findings from research it supports to be submitted promptly for publication, with authorship that reflects accurately the contributions of those involved. It expects investigators to share with other researchers, at no more than incremental cost and within a reasonable time, the primary data, samples, physical collections, and other supporting materials created or gathered in the course of the research. It also encourages awardees to share software and inventions or otherwise act to make such items or products derived from them widely useful and usable.

NSF will implement these policies in ways appropriate to the field of science and circumstances of research through the proposal review process; through award negotiations and conditions; and through appropriate support and incentives for data cleanup, documentation, dissemination, storage, and the like. Adjustments and, where essential, exceptions may be allowed to accommodate the legitimate interests of investigators and to safeguard the rights of individuals and subjects, the validity of results, and the integrity of collections.

2. Policies for Openness

Appropriate commercialization of the results of research will continue to receive encouragement by permitting grantee institutions to keep principal rights to intellectual property conceived under NSF sponsorship. The Foundation emphasizes, however, that retention of such rights does not reduce the responsibility of researchers and institutions to make research results and supporting materials openly accessible.

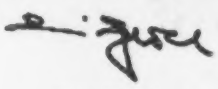
The Foundation strongly recommends that all NSF grantee institutions develop, implement, and publicize comprehensive policies for dealing with potential restrictions on openness arising from concurrent private sector support. Such policies and related procedures should preserve the prime function of academic institutions as creators and transmitters of knowledge, while safeguarding the independence of the faculty and the interests of the students.

3. Policies for alleged fraud and misconduct

Open scientific communication demands and encourages responsible, ethical behavior on the part of those who conduct, manage, and sponsor research. Everyone in science and engineering must guard against fraud and misconduct.

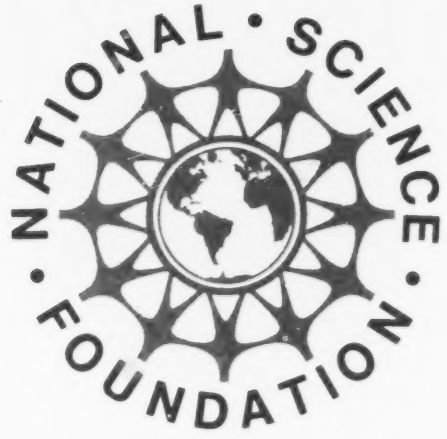
NSF expects all grantee institutions to comply fully with its current requirements for formulating and implementing policies to deal with alleged incidents of scientific fraud and misconduct. These policies should insure due process for those accused, provide for effective and impartial investigation and resolution of charges, specify appropriate disciplinary actions for those found to have committed offenses, protect from adverse actions those who bring charges in good faith, and insure prompt reporting of all cases in which fraud or misconduct are proven to exist to parties with a legitimate need to know.

Primary responsibility for investigation, enforcement, and reporting when fraud or misconduct is alleged rests with the grantee institution. NSF takes responsibility for monitoring the process and for satisfying itself and the public, if necessary by independent investigation, that any alleged misconduct is dealt with promptly, fairly, and forcefully.



Erich Bloch
Director

National Science Board



Report of the NSB Committee on Openness of Scientific Communication

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(Additional copies of this report (NSB-88-215) are available from Forms and Publications, National Science Foundation, Washington, DC 20550 (202) 357-7861).

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National Science Board Resolution re Report of the Task Committee on Openness of Scientific Communication

The National Science Board unanimously accepted the report and recommendations of the NSB Committee on Openness of Scientific Communication as contained in *NSB-88-215*, and requested the Director to report back to the Board on proposed implementation plans at the February 1989 meeting.

December 2, 1988

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Mr. Tom Wajda, Director, Office of Maritime and Land Transport, Bureau of Economic Affairs, U.S. Department of State, Washington, DC

Dr. Mitchel B. Wallerstein, Associate Executive Director, Office of International Affairs, National Research Council, Washington, DC

A number of the above witnesses also provided constructive reviews of the draft manuscript. We are also indebted to several other knowledgeable individuals who provided thoughtful review comments. These include Dr. John H. Moore, Deputy Director, Mr. Charles H. Herz, General Counsel, and Mr. Leonard L. Lederman, Head of the Special Analytical Studies Section, of the National Science Foundation; Dr. Rosemary Chalk, Study Director for Government-Industry Cooperation in Biomedical Research, Institute of Medicine; and Dr. Deborah Runkle, Senior Program Associate, Office of Scientific Freedom and Responsibility, American Association for the Advancement of Science.

Special thanks are also due Mr. Thomas Ubois, Executive Officer, National Science Board, for his wise advice and counsel and to the staff of the National Science Board Office, especially Ms. Andrea McIntyre, for their helpful assistance. Finally, we acknowledge the insightful editorial advice of Ms. Connie Bart, Office of the President, Cornell University.

OPENNESS OF SCIENTIFIC COMMUNICATION

FUNDAMENTAL PROPOSITION

Our fundamental proposition is that open scientific communication is:

- An indispensable tool for creating verifiable, shared bodies of scientific knowledge;
- A determinant of the rate of scientific and technological progress, which is dependent upon information and data developed by others;
- A necessary condition for efficient and proper use of public and private research funds;
- A primary force in enhancing cultural, social and economic well-being; and
- An ideal consistent with and supportive of the values of an open democratic society.

Exemplary ethical and professional standards and behavior by researchers, research directors, and sponsors are a necessary condition for maintaining openness, for an open system must transmit valid or verifiable information. Conversely, an open system provides incentives for proper ethical behavior and high professional standards.

SOCIAL CONSTRAINTS ON OPENNESS

In principle, all who believe they can benefit from access to information, once produced, ought to be able to get it at the incremental cost of transmission. There are, however, valid reasons for withholding and controlling information and for allowing limits on open dissemination. Such grounds include national security, the conduct of diplomacy, individual privacy, commercialization of intellectual property, and international competitiveness.

In accommodating these diverse interests, we recognize it will sometimes be necessary to make trade-offs between openness and control. What our fundamental proposition means, then, is that maintaining openness generally has a superior social claim over other objectives deriving from economics or national security. Restrictions on openness should be approached as exceptions, rather than norms. Any restrictions government or other institutions impose on the free flow of information must meet high standards of proof of their necessity.

Openness and National Security

During the post World War II era, the application of national security criteria to scientific information has periodically posed a significant strain on the principle of openness. But recognizing that extensive application of security provisions such as those contained in the Export Administration Act would result in significant losses in the production and use of scientific information, and these, in the long run, would translate into security and economic losses, the government has now established general guidelines and policies to maintain openness.

The Commerce Department, with the advice of scientists from universities and industry, has redesigned its general license for technical data available (GTDA) which provides for the export of domestically open scientific and technical information. It has decided that there will be no restrictive changes in how this information is treated. The Department has not yet made the revisions final and published them, however.

The Department of Defense has stated that it will only classify university-based fundamental research in exceptional cases. Current government policy, as stated in National Security Decision Directive 189 (1985), specifies that security classification is the sole means of restricting publication of federally funded, fundamental academic research.

Since science and technology change quickly, disputes over national security relevance are bound to come up again. Settling disputes arising from new interpretations and applications of policy is costly and time-consuming to all parties. Further, bargaining usually leads to some de facto loss of openness.

We believe that the clash between openness and national security concerns has abated for the time being. However, we also believe that actual practice and behavior should be monitored and documented at a high policy level by the cognizant agencies of government. We also believe that the Commerce Department should make its revised rules on domestically available information binding and public.

Information and Industrial Competitiveness

U.S. technical peers frequently appropriate open scientific and technical information produced in the United States. This increases foreign competitiveness in both domestic and international markets in the short run. It imposes a cost on some U.S. industries in profits and employment, although there may, of course, be the offsetting benefits of U.S consumers getting higher quality products at lower cost. At the same time, the United States obtains benefits from appropriating open information produced abroad.

In the long run, scientific and technical information will naturally flow from the more technologically advanced nations to the newly industrializing countries whose technological and economic bases are still emerging. Indeed, in the nineteenth century, the United States was a newly industrializing country, and it depended on capturing and commercializing information produced abroad. On the one hand, information produced in the United States and captured abroad creates new competitors.

On the other, new competitors also represent new markets for goods and services produced in the United States, if the United States exploits these markets effectively.

There is little evidence that the cause of the nation's current trade and productivity problems is the transfer of basic scientific information to rival firms in other nations. Indeed, the United States still remains a strong "first mover" in the introduction of new products and processes. But abroad, larger numbers of capable second movers now exist who are able to compete on price or quality.

Patents, trademark and copyright laws, and other mechanisms to protect intellectual property are essential if American firms are to invest the substantial sums required to transform interesting research results into commercially viable products and processes. But U.S. trade policies that restrict the international flow of basic scientific information, along with commercially relevant technical information, fail to recognize the increasingly international character of scientific information or the growing research capabilities of other nations. In the long run, as the research capabilities of other countries grow, there is more information for the United States to acquire if only it makes the necessary effort. There is no inherent reason why the United States cannot be both a good first mover and a good second mover.

We believe, first, that the United States must work harder to maintain and enhance its domestic capabilities for innovation. We believe, next, that the United States must improve its capabilities for capturing and commercializing information produced abroad. We believe, finally, that appropriate intellectual property laws are essential at home and abroad to protect the development of useful products and services. However, nations benefit most, over the long run, when they all contribute to and share in the exchange of scientific knowledge.

REQUIREMENTS FOR OPEN SCIENTIFIC COMMUNICATION

At least four key elements are required to ensure an open system of scientific communication: an effective publication system, an open academic environment, supportive government policies, and a responsible scientific community.

An Effective Publication System

The publication of scientific journals remains an effective way to disseminate and store information, ensure quality in research, and convey recognition and prestige to individual investigators and research teams. Rising subscription prices, the limited acquisition budgets of many libraries, and substantial prepublication costs incurred by smaller journals are causing strain, however. Some of these problems may be ameliorated through the growth of electronic publishing and communication, but new ones will arise, especially in the areas of quality control, professional recognition, and equality of access.

In view of the growing volume of information being generated both in this country and abroad, the nation also needs more effective ways to translate and disseminate scientific literature from other nations and more authoritative surveys and overviews of research fields and topical areas.

We believe the nation's scientific communication system is meeting most of the purposes for which it was intended. The proliferation of new fields and subfields, the growing importance of foreign research journals, and the implications of electronic publishing technologies must be addressed, however, in order to ensure the future integrity and utility of the system.

An Open Academic Environment

Universities believe that freedom of inquiry, the open exchange of ideas, and relative freedom from external pressures are essential if they are to serve society through open production and verification of knowledge. With substantial research funding now available from defense and corporate sources, universities have balanced their traditional insistence on openness against the proprietary and/or national security concerns of those who sponsor their research.

Academic research has benefitted greatly from Defense Department support for investigations in such important fields as engineering, computer science, and mathematics. Prepublication review, sometimes negotiated with defense sponsors, has so far not led to significant delays or restrictions on open publication. Most institutions, however, decline to carry out classified research or do so through affiliated research institutes, often separated organizationally from regular teaching and research.

Similarly, corporate support of university research has advanced knowledge in biotechnology, materials, microelectronics, and computers without unduly compromising either the interests of sponsoring firms or universities. Many universities have been able to retain the right to open publication of research results while giving corporate sponsors time to file for patent protection. Such arrangements rarely pose a serious threat to the openness of scientific communication because the delays are typically short – often only sixty to ninety days. They also rarely pose a threat to commercialization since the relevent information disclosed in the research publication is typically quite similar to that contained in the patent filings. In the case of industrially supported research, some model agreements already exist that provide reasonable protection for openness, and these can be used as a starting point in individual negotiations. For example, the Government-University-Industry Research Roundtable published a model agreement in 1987.

We believe industrial and military support generally enrich the content of university research and teaching and extend the contributions that academic institutions can make to the rest of society. We also

believe that special care must be taken to preserve the balance between openness and the protection of other legitimate social interests.

Supportive Government Policies

Historically, the Federal Government has made scientific information widely available on the principle that the public should have free and open access to any information produced with its resources except when necessary to protect military secrets, proprietary rights, or individual privacy. The benefits of following this principle have been substantial. Open dissemination of research sponsored by the U.S. Department of Agriculture, the National Aeronautics and Space Administration, and the National Institutes of Health, for example, has been widely credited with the enormous success of American agriculture, commercial aviation, and public health.

The National Science Foundation encourages open communication of the research it supports by providing funds for publication and travel and by requiring special dissemination activities at selected research facilities and centers it supports. Several other federal agencies, including the National Institutes of Health, the Department of Education and the Department of Commerce have succeeded in instituting effective dissemination systems, including automated data bases, although these remain secondary to publication in journals.

A distinction must be made, however, between nonexclusivity in research, which is appropriate and necessary, and the exclusivity necessary for developing new products and processes, which is also appropriate and necessary. Every country strikes a balance between the two through its patent system and its laws on trade secrets and intellectual property. However, the balance can change depending on relative costs and benefits. For example, at one time the Federal Government required that all patentable discoveries funded by federal grants have nonexclusive licenses. Very few companies were then willing to develop the potential drugs, therapeutics, and other products and processes, because their investments in development could not be protected.

During the past three decades, successive administrations have attempted to achieve more private sector commercialization of scientific and technical information produced by the Federal Government. The Patent and Trademark Amendment Act of 1980, the Stevenson-Wydler Technology Act of 1980, and President Reagan's 1983 memorandum extending title rights to most federal contractors all attempt to make commercialization more attractive. In some cases, efforts to commercialize the results of internally generated research, such as that produced in Department of Energy national laboratories, have opened up previously unexploited technologies. However, the Federal Government's attempts to develop and disseminate new technologies for private sector use have generally been less successful than the efforts carried out by the private sector itself.

We believe that current efforts to commercialize research carried out at academic institutions must balance non-exclusive rights to scientific information necessary for intellectual progress, and exclusive rights to information necessary to obtain marketable new products and processes. Federal policies should be sensitive to this distinction.

In addition, we believe that federal efforts to commercialize the results of internally generated research can help bring previously unexploited technologies into public use. However, the Federal Government, in general, is not the most appropriate agent for developing commercial products and processes.

A Responsible Scientific Community

Open scientific communication depends, above all, on the ethical and responsible behavior of the individual scientist. Documented instances of scientific misconduct are relatively rare compared to the size of the research enterprise, although some cases of fraud and misconduct are, no doubt, resolved privately. Nonetheless, recently reported cases raise serious questions about the scientific community's ability to enforce high professional and ethical standards. The community assumes that unethical behavior is an anomaly and that the system is inherently self-correcting. The self-correcting mechanisms may not be strong enough in the face of private incentives and opportunities provided in highly competitive research systems.

Misconduct by university researchers can assume many different forms. In addition to fabrication and falsification, misconduct includes plagiarism, denying or unduly delaying access to scientific data, samples and experimental software and hardware, unwarranted co-authorship, indefinitely withholding publication for reasons of personal or commercial advantage, and ignoring wrong-doing by colleagues. Not in the class of misconduct, but costly to the scientific enterprise, is the habit of running up numbers of publications by fragmenting findings and of rushing to publish every finding, whether significant or not, in some journal.

A principal reason for unethical or improper behavior is the system of incentives and rewards created by the intensely competitive nature of scientific research. The need for prestige, professional advancement and research funding can induce some researchers to misrepresent or manipulate their work for their own advantage. The benefits of a competitive research system seem clear and need to be retained. But universities have latitude to adjust incentives and rewards and some universities now base tenure and promotion decisions more on the quality of a scientist's best work rather than on the total number of publications. For example, Harvard Medical School only considers ten publications in its promotion and tenure decisions to the full professor level.

Some federal agencies, including the National Science Foundation and the National Institutes of Health, require universities to have systems in place for addressing misconduct fairly and effectively and provide for agency intervention in cases which cannot be resolved on an institutional level.

We believe that scientific misconduct represents a serious potential threat to the integrity of science. In the current era of public accountability, even the perception that professional standards of scientific conduct are eroding is unacceptable and must be addressed directly and openly.

RECOMMENDATIONS

With very few exceptions, we assert that the national interest will be served best if the results of research carried out in our universities and publicly sponsored laboratories are made available to all who wish access to them. To this end, we recommend the following:

For the Federal Government

- MONITOR IMPLEMENTATION OF CURRENT POLICY OF GENERAL OPENNESS TOWARD UNIVERSITY-BASED RESEARCH. The government should retain high-level monitoring and oversight procedures to be sure that applications of classification rules and export controls remain consistent with a policy of openness.

- EMPHASIZE GENERIC RESEARCH. Federal sponsorship of research and development should emphasize the production of generic scientific and technical information rather than information likely to be of direct or specific commercial use.

- REVIEW PATENT AND PROPERTY RIGHTS POLICIES AND PRACTICES TO ASSURE OPEN SCIENTIFIC COMMUNICATION. The Federal Government should periodically review its policies and practices on patents and property rights to ensure that they strike a reasonable balance between rapid dissemination of basic knowledge and the exclusivity required for that knowledge to be utilized.

- CARRY OUT A COMPREHENSIVE ASSESSMENT OF THE NATION'S SCIENTIFIC PUBLISHING AND DISSEMINATION SYSTEM. The assessment should cover the impact of electronic publishing systems, including their economics and changes in publication practices. Impacts on openness should receive special attention.

- REQUIRE RECIPROCITY IN ACCESS TO FACILITIES AND CENTERS AND SEEK SYMMETRY IN INTELLECTUAL PROPERTY RIGHTS. Participation in U.S. research centers or consortia should be open to all nations who want to participate on a reciprocal basis. International science agreements should provide the United States rough "quid pro quo" in access to foreign laboratories, facilities, and data bases. Agreements should provide for symmetry and consistency in intellectual property rights as well.

For the National Science Foundation

- PLACE ADDED EMPHASIS ON OPEN SHARING OF INFORMATION BY ALL NSF AWARDEES. NSF expects that significant research conclusions be submitted for publication in an appropriate journal in a timely manner; that authorship truly reflect the contributions of those involved; that, in most cases, primary data, samples and other supporting materials that are the basis for publication be made available upon request. NSF should pay for any data clean-up, documentation, dissemination and storage that may be required.

- ASSESS ACTUAL INFORMATION POLICIES AND PRACTICES. The Director of NSF should carry out an assessment of current information transfer and dissemination practices in all NSF programs and take any corrective measures necessary to satisfy the dual objectives of maximum scientific openness and maximum utilization of research results.

NSF should publicize its interest in receiving rigorous proposals for data and information integration and for scientific evaluation and assessment activities. The agency should provide the resources necessary for this work.

- FURTHER ENCOURAGE INTERNATIONAL EXCHANGE OF SCIENTIFIC INFORMATION. The NSF should support more, longer-term interactions between U.S. scientists and engineers and foreign research institutions and encourage unrestricted travel of American and foreign scholars for professional purposes. It should also facilitate translation and domestic distribution of foreign scientific literature. Parallel efforts should be undertaken by the private sector and other federal agencies.

For Universities

- DESIGN POLICIES FOR MAINTAINING OPENNESS WHEN MILITARY OR CORPORATE SPONSORS ARE INVOLVED. Universities should develop, implement, and disseminate comprehensive policies for dealing with potential restrictions on scientific communication arising from military or industrial support. These should preserve the prime function of the university as a creator and transmitter of knowledge while safeguarding the independence of the faculty and the interests of the students.

- DEVELOP AND PUBLICIZE POLICIES FOR DEALING EFFECTIVELY AND FAIRLY WITH ALLEGED SCIENTIFIC MISCONDUCT. Universities should expand upon the procedures now required by NSF, NIH and other federal agencies to ensure the integrity of all research, regardless of the funding source. The necessity of maintaining the highest standards of scientific integrity should be widely publicized and discussed within the academic community.

Universities, through their various associations, should develop and disseminate guidelines for ethical conduct involved in research and graduate training.

Professional Societies

- DEVELOP AND DISSEMINATE CODES OF ETHICS APPROPRIATE TO EACH DISCIPLINE. Professional societies should continue to develop and disseminate codes of ethics for each discipline. National organizations such as the American Association for the Advancement of Science and the National Academies should assist in developing these codes. The societies should reinforce the codes by intensive educational activities.

APPENDIX A

Principal Background Materials

AAAS ABA National Conference of Lawyers and Scientists, "Project on Scientific Fraud and Misconduct." Report of Workshop One, Washington, DC: AAAS.

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APPENDIX B
NSB/OPEN-88-1

NATIONAL SCIENCE BOARD
WASHINGTON, D.C. 20550

March 4, 1988

MEMORANDUM TO MEMBERS OF THE COMMITTEE ON OPENNESS OF SCIENTIFIC COMMUNICATION

Dr. Rhodes, Chairman
Dr. Duderstadt
Dr. Hess
Dr. Hosler
Dr. Nordtvedt
Dr. Powell

Subject: Appointment and Charge of the Committee on Openness of Scientific Communication

This is to confirm your appointment to the subject committee. Your charge is to consider the issues associated with "Openness of Scientific Communication." You should use the attached background paper as a starting point and framework for your committee's deliberations; you should feel free to develop and modify this charge as necessary. Dr. Harvey A. Averch, Senior Staff Associate, Office of the Director, will serve as Executive Secretary to your committee.

In the course of your work, you are encouraged to consider the use of the following mechanisms: (1) engage outside experts who would serve as consultants to the committees and be full participants in committee work; (2) solicit the views of appropriate individuals in the field, e.g., through committee visitations or hearings; and (3) utilize Foundation resources to provide special analyses and literature compendia. Please concentrate on concrete "deliverables" for full Board consideration and presentation to the Director as guidance for Foundation management.

Your work should begin at the March 1988 meeting of the National Science Board. You should plan to provide brief, interim reports to keep the full Board apprised of your progress. A final report should be submitted to the Board by the time of the November 1988 NSB Meeting.

Roland W. Schmitt
Chairman

Attachment

OPENNESS OF SCIENTIFIC COMMUNICATION

Issue: There is an apparent conflict between the desire to encourage open communication and broad dissemination and sharing of research results, on the one hand, and the desire to withhold results for reasons of competitive advantage or national security, on the other.

Background: There is broad, but not universal, recognition that science flourishes best in an atmosphere of openness where there are no secrets and research results are shared freely and promptly with others. The Foundation has always encouraged prompt publication of results, and in some cases has imposed specific requirements for public access to data produced in the course of NSF-sponsored research.

Recently, two threats to this open approach have arisen. One is external and results from attempts to restrict publication, control attendance at scientific meetings, deny access to research facilities, and otherwise limit the free flow of unclassified scientific and technical information. These attempts have been made in the name of national security and also in the name of industrial competitiveness.

A second threat is internal and results from heightened awareness of commercial opportunities on the part of researchers and research institutions. Some academic investigators, with or without the active participation of their sponsoring institutions, are withholding research data, at least temporarily, in order to exploit a potential commercial competitive advantage.

Questions:

1. What are current NSF policies regarding dissemination of research data? (Staff)
2. What specific instances of direct external restrictions have occurred and what specific effects can be cited? (Staff)
3. Is deliberate withholding of data by researchers a common practice? Does it present a serious problem?
4. How can electronic databases and communication networks best be used to enhance dissemination and exchange of research results? Are there risks involved?
5. What are the risks and benefits of free flow of scientific and technical information?
6. What changes to NSF policies, if any, should be made to encourage more open scientific and technical communication?
7. What national policies concerning open communications are appropriate?

Deliverables: 1) an NSB "White Paper" recommending national policies regarding restrictions on scientific and technical communication; and 2) NSF policies on dissemination of and access to research results.

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DAVID PIERPONT GARDNER
President

WILLIAM B. FRAZER
Senior Vice President—
Academic Affairs

OFFICE OF THE PRESIDENT
BERKELEY, CALIFORNIA 94720

June 14, 1988

ACADEMIC VICE CHANCELLORS

Dear Colleagues:

In September 1987, I learned from the UCLA library that the agreement for access to the NASA RECON online database contains the following stipulation, which applies to all use of the NASA RECON database, including access to unclassified information:

> "Access is permitted only within the U.S., and to U.S. citizens, unless specifically authorized by RMS [RMS Associates is the NASA contractor for RECON service]. If citations are printed out, they must be similarly restricted."

In November, we discovered that the RECON database service was undergoing internal review by NASA, and that this provision might be modified. We have recently learned that the NASA review is completed, and that the restriction will not be changed. A copy of the agreement is enclosed for your information.

This restriction is in conflict with University policy which states in part that the University does not "discriminate on the basis of citizenship, within the limits imposed by law or University policy" in admission, access and treatment in University programs and activities. Also, enforcement would be difficult and might raise significant legal and policy problems regarding privacy and confidentiality of library records. Finally, we are informed by NASA officials that if a search conducted under the terms of this agreement were to lead, however inadvertently, to a violation of federal export control laws, employees of the University might be liable for prosecution under those laws.

We have reviewed the legal and the policy aspects of this situation, and our advice is to avoid entering into an agreement with RMS Associates for access to the NASA RECON database. If you have entered into a contract, we advise you to cancel it at once, informing NASA of the reasons for doing so.

I point out that there is an alternative to NASA RECON, i.e., the Dialog Aerospace Database (File 108). The Dialog database carries no restrictions regarding citizenship (although there are restrictions regarding access by foreign governments and organizations, and "persons acting on their behalf"). However, the

Dialog service does not include some files (holdings of the NASA libraries; pre-1960 NASA reports; reports from NACA, NASA's predecessor, 1915 to 1958; NASA technical briefs, contract records, and research-in-progress reports) that are available only through NASA RECON. Although the Dialog database is more costly, available evidence suggests that total Universitywide outlays for searching Aerospace Database probably do not exceed $1,500 per year at the present time, and the savings from using NASA RECON would be modest.

We recognize that if this situation arises again, there may not be an alternative service. We are informed that, if the circumstances warrant, there are grounds to question the authority of a federal agency to impose such a restriction in the absence of express congressional authorization. It can be argued that a restriction which limits access to unclassified information in a publicly supported database is inconsistent with Federal policy and has no basis in law or executive action.

We have been advised by the Office of the University Contracts and Grants Coordinator that it would be wise for you to make an effort to coordinate with your campus contracts and grants officers and with your purchasing departments on federal contracts involving access to databases. We will continue to monitor issues such as this, and maintain contacts with organizations such as the Association of American Universities, the Association of Research Libraries and the American Library Association.

I would appreciate your assistance in bringing similar problems to my attention.

Sincerely,

Calvin C. Moore
Associate Vice President
Academic Affairs

Enclosure

cc: Senior Vice President Frazer
Chancellors
Library Council
University Contracts and Grants Coordinator Mears
University Materiel Coordinator Ove
University Counsel Dorinson
Director Cole
Director Smith
Coordinator Lawrence
Principal Analyst Yoder

between

User Organization
and
RMS Associates
NASA Scientific and Technical Information Facility

This agreement between RMS Associates and the User Organization named above is intended to set forth the terms and conditions for each party in connection with the User Organization being permitted access to the NASA/RECON File collections at the NASA STI Facility.

1. RMS agrees to provide:
   a. Access via dial-up terminals to NASA/RECON during the time period 8:00 AM - 7:30 PM ET Monday through Friday, excluding Federal holidays.
   b. User manuals, user bulletins, vocabulary updates, corporate source updates, and other training/user aids as issued for use with the NASA/RECON system.
   c. An initial training course free of charge at the NASA STI Facility for one individual. RMS reserves the right to specify the time, length, and type of training.
   d. Assistance during normal operating hours (8:00 AM - 7:30 PM ET) to resolve operating problems and difficulties.
   e. A single password that is unique to that organization and site. Separate sites that jointly can be issued separate passwords.

2. The user organization agrees to provide:
   a. Personnel to operate its dial-up terminals.
   b. Dial-up terminals that are compatible with the NASA/RECON system.
   c. Installation and service of communications equipment used to access the NASA/RECON system.
   d. Representation, if desired, at the training courses conducted by RMS, including salaries, travel and other expenses of these personnel during the training period.
   e. Protection from unauthorized access to and use of the NASA/RECON system or the password is not to be shared with other organizations or sites. Person and organizational unit to which the password is issued will be charged for all use.
   f. Periodic reports, upon request by RMS, on the use of system, and feedback evaluation forms on the system as required by RMS.

3. The user organization agrees to pay:
   a. System and additional training charges for online usage of NASA/RECON. System and training charges will be subject to periodic review and rate changes shall become effective after the user organization has been given a minimum of 60 days notice. Current charges are as follows:

Computer Connect Time (per hour)		$24.00
Citation		$ 0.03
User Enrollment Fee, to initiate service (per password)		$50.00
Annual Maintenance Fee, prorated for the first year (per password)		$50.00
Telenet (connect hour)		$ 13.00
Additional NASA/RECON training at the NASA STI Facility (per person)	Basic	$100.00
	Advanced	$180.00
Off-site NASA/RECON Training (per person)		negotiable

   b. Communications charges which will be the 'common carrier' charges and will be levied by the communications companies.

[redacted]

5. Access is permitted only within the U.S., and to U.S. citizens, unless specifically authorized by RMS. If citations are printed out, they must be similarly restricted.
6. The user agrees not to sell or lease any information, data and/or printouts obtained under this agreement unless specifically authorized by RMS. An exemption from this requirement is granted when such information is used as a part of, and is incidental to a scientific report or study.
7. Both parties will designate project officers responsible for the administration of the agreement.
8. This agreement shall remain in effect until amended by mutual consent or terminated by either party upon 30 days written notice. Failure of the user organization to adhere to the terms of this agreement will result in an immediate denial of access to the NASA/RECON system. Should the incumbent Contractor Manager (RMS) be succeeded by another Contractor Manager during the term of this agreement, such successor shall automatically be substituted as the 'Contractor Manager' in this agreement.

For _____
Signature

_____
Name and Title (Typed) (Date)

For RMS Associates Contractor Manager
Scientific and Technical Information Facility
National Aeronautics and Space Administration

_____
Robert B. Johnston, Vice President/General Manager Date

FF396 OCT 80 (REV)

As Science Moves Into Commerce, Openness Is Lost

Some hail new secrecy; others see harm to science.

By WILLIAM J. BROAD

SCIENTISTS, scholars and Congressmen are raising alarms about what they see as major new assaults on the traditional openness of science, a rise in secrecy they fear may undermine the long-term progress of science and innovation.

Dramatic increases over the last decade in scientists' ties to commercial enterprises, these experts say, are adding to a trend toward secrecy that had already been accelerated by the rising role of military contracts in the nation's scientific research.

"Today there's clearly a lot more protection of basic science," said John Irvine, a science policy analyst at the University of Sussex in England.

A decade ago, as university researchers developed ties with biotechnology companies, the specter of growing secrecy brought wide predictions of great damage to science. Now, with those links well established, even expected, and commercial enterprises reaching out to more of science every day, some contend that their worst fears are coming true. Others hail the new secrecy as arriving none too soon.

Provoking the latest concern and debate is a White House proposal to restrict the flow of information to foreign rivals in an area of research rich with commercial potential: the newly discovered superconductors, materials that lose all resistance to electricity at higher temperatures than materials achieved in the past.

"This proposal is seriously misguided," Robert L. Park, director of public affairs for the American Physical Society, said at a recent Congressional hearing. "This reeks of chauvinism and ignores the international character of the research."

But proponents say the benefit of expanded commercial secrecy include a better chance for rapid innovation and for upstaging rivals.

"It's a fascinating issue," said Gordon T. Longerbeam, an official at the Lawrence Livermore National Laboratory in California. "Should scientific inquiry be conducted in a totally open environment? Or should we contain it a little bit, in some selected areas, long enough for American industry to take advantage of it first? That's a key question. It's permeating the whole scientific community right now."

Critics of the new commercial secrecy say the risks include a possible drop in long-term productivity if the intellectual ferment of public science fades and if speculative projects are set aside for practical ones.

"Secrecy violates the social nature of science, the idea that science is shared, that it's a cumulative activity," remarked Dorothy Nelkin, a sociologist at Cornell University who has written widely on science policy. Among the dangers, she added, were not only productivity "breakdowns" but the tarnishing of the scientific image. "As scientists are seen as

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New York University, Fabricant

Dorothy Nelkin, an expert on science policy, believes that secrecy violates the fundamental social mechanisms that fuel discovery.

NASA

William R. Graham, President Reagan's science adviser, took steps to bar foreign scientists from key research areas.

THE NEW YORK TIMES, TUESDAY, MAY 24, 1988

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profiteers, they might get less public support," she said.

The ethic of open scientific publication had its inception three centuries ago. In this practice, reports of new discoveries are rushed into scholarly journals so insights can be widely shared, spurring the work of others and bringing public recognition to the scientists.

In contrast, the new commercial secrecy seeks to delay publication of research findings or to eliminate it altogether so industry can use the secret research to make make innovative products no rival can match. The reward for researchers tied to such ventures is money rather than public acclaim.

Commodity or Calling?

Scholars say the fundamental force behind the expansion of industrial secrecy is the narrowing of the gap between science and technology, between understanding nature and using that knowledge to shape the natural world through new technologies and products.

In the early days of science, discoveries often found practical application only after the passage of decades or centuries, encouraging the free flow of ideas. But today the delay can be as short as years and sometimes months. The result is that industry and inventors are increasingly eager to tap science as soon as possible and to monopolize its findings.

In the 17th century, at the start of the scientific revolution, the information ethic was very different, the emphasis being on openness. One of the world's first journals, the Philosophical Transactions of the Royal Society of London, founded in 1665, pioneered in inducing men of science to disclose their ideas freely. By dating when communications were first received, it could insure priority for scientific discoveries, the main source of glory in science.

As Henry Oldenburg, first editor of the Transactions, put it in a letter to a colleague, the society would be "very carefull of registering" the time of newly arrived materials, "whereby the honnor of ye invention will be inviolably preserved to all posterity."

Over the centuries, the ethic of open publication has fared well for the vast majority of the research enterprise, which today is made up mainly of university and government laboratories. The ultimate accolade in this open system is the Nobel Prize, given for freely published research meant to benefit all mankind.

Genetic Engineering Partnerships

But in the last decade, industrial secrecy has moved out of company laboratories and rapidly expanded into new arenas. American universities were tapped in the late 1970's and early 1980's when new discoveries in the life sciences raised the prospect of genetic engineering. As researchers synthesized insulin, growth hormone and interferon and predicted a host of other important products, industry wooed them with lucrative contracts.

E. I. du Pont de Nemours & Company gave $6 million to the genetics department of Harvard Medical School. Monsanto gave $23.5 million to Washington University for research in medical uses of proteins and peptides. The West German-based Hoechst A.G., one of the world's largest chemical companies, gave $70 million to Massachusetts General Hospital, the largest teaching hospital of Harvard Medical School.

'As scientists are seen as profiteers, they might get less public support,' one sociologist says.

The industrial payoff in these and hundreds of other joint ventures is exclusive scientific information that can be applied or patented. Depending on the type of agreement, scientific information is either withheld from publication for a limited period so the industrial partner can obtain a patent or, less often, never published at all, so that the industrial partner has what is known as a trade secret.

'Property of the Sponsor'

In a survey of 1,200 faculty members at 40 universities, one study found that 12 percent of the respondents with industry ties said their research had resulted in "information kept secret to protect its proprietary value." Moreover, 24 percent said they had done research "the results of which are the property of the sponsor and cannot be published without their consent."

David Blumenthal, a Harvard Medical School professor who helped conduct the survey, said the practice of secrecy, though apparently widespread, was often denied by university officials. "They shouldn't pretend it doesn't exist," he said. "They should put rules in place to contain it."

To help fight academic secrecy, the National Academy of Sciences in Washington and the Industrial Re-

search Institute in New York this year proposed a joint model for university-industry partnerships that calls for as much openness as possible. "The agreements should in no way prevent eventual publication," said Don Phillips, an academy official. "It's crucial to the advancement of science."

Recently, the expansion of industrial secrecy has spread to the nation's system of hundreds of Federal laboratories, which do everything from hybridizing wheat to making atom bombs. The links between the Federal labs and industry have been encouraged by Congress and the Administration, which are eager to increase American industrial innovation and productivity.

Federal Labs, Private Money

In exchange for dollars, Federal researchers at the Livermore laboratory in California are now working with private companies on research in such areas as steel, biotechnology and electronics. According to Dr. Longerbeam, the Livermore official, the agreements typically call for publishing delays of up to a year and could in the future require total secrecy.

"I can very easily visualize an environment where, for certain key aspects of research, we would agree never to publish," he said.

He stressed, however, that the lab was committed to limiting secrecy because of its long-term risks and dangers. "Clearly, it's not in our interest to go too far in that direction," he said, adding that the lab tried to strike a balance between "the ideologues who'd like to seal the borders of the country and the pure academics who say everything should be totally open."

A new partnership recently formed at the Los Alamos National Laboratory in New Mexico, where Federal researchers agreed to collaborate on supercomputer research with the International Business Machines Corporation. The joint aim is to perfect a new, more powerful machine.

Claudia Koontz, an I.B.M. spokeswoman, said the company had the right to review Los Alamos manuscripts that might arise from the joint project and that it was "possible but highly unlikely" that it would prohibit publication.

The secrecy surrounding industry's new ties to universities and Federal laboratories has generally prompted mild debate. However, the White House recently tried to open the secrecy umbrella to cover not just specific partnerships with private companies but a whole class of basic research, touching off a firestorm of protest from scientists.

The effort got under way last July when the White House denied all foreign officials and scientists access to a major conference in Washington on the commercial applications of superconductivity. The move was engineered by President Reagan's science adviser, William R. Graham.

At the meeting, President Reagan hailed a "new arena for the spirit of enterprise" as he unveiled an 11-point program to help America beat foreign rivals in commercializing new superconductor breakthroughs.

Hearings on Competitiveness

Then in February, the Administration sent Congress its Superconductivity Competitiveness Act, which has a provision for withholding "commercially valuable" scientific information developed in Federal laboratories from release under the Freedom of Information Act, in theory hiding their work from foreign rivals.

"It touched off a brouhaha," noted Deborah Runkle, a policy analyst at the American Association for the Advancement of Science in Washington. The fear among scientists, she said, was that the act would encourage broad secrecy in a pivotal area of basic research. The act was assailed at a hearing held by Sen. Patrick Leahy, Democrat of Vermont, before the Senate subcommittee on Technology and the Law.

Information Policy and Competitiveness

by Robert L. Park
Director, Office of Public Affairs
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Park

This opportunity to express the deep concern of the American Physical Society (APS) over proposals to impede the free exchange of unclassified scientific and technical information is appreciated. The APS is the leading organization of physicists in the United States, with 40,000 members in university, industry and government laboratories. About 4,000 members reside outside the United States. The purpose of the society is to advance physics through the publication of journals and the organization of meetings for the exchange of scientific information. In 1987 the society published 60,000 pages of scientific papers and held or sponsored 37 scientific meetings.

It has been exactly one year since the APS held a special evening session at its annual March meeting in New York to discuss the latest developments in superconductivity. It was the most extraordinary event that I have witnessed in more than 30 years in physics.

The session was hastily organized. Barely a month had passed since Paul Chu's group at the University of Houston, improving on the discovery of a new class of superconductors by Bednorz and Mueller in Zurich, had demonstrated superconductivity at 94K. That is about −270F, which may still seem pretty cold, but it's 23 degrees Fahrenheit above the boiling point of nitrogen, which is endlessly abundant and cheaper than Perrier water. It was that achievement, superconductivity at the temperature of liquid nitrogen, that started this race in earnest. Thousands of scientists overflowed the ballroom of the New York Hilton, into corridors and lobby areas where tv monitors had been set up. The meeting did not end until 3:15 the next morning when the last of the five-minute reports was given. Even then, groups of scientists remained until after daybreak discussing what they had learned.

The 1988 March meeting of the APS will take place in New Orleans. More than 600 papers on superconductivity, involving scientists from 22 countries, are scheduled for delivery. In fact, an open scientific conference to exchange information on superconductivity is taking place somewhere in the world on an average of once or twice a week. Within the past month there have been reports of superconductivity above 120K from groups in Tokyo, Little Rock and Yorktown Heights, and there are tantalizing indications of this phenomenon at much higher temperatures. Physicists are working with chemists and crystallographers and ceramicists to improve the current carrying capacity and mechanical properties of these new materials. Theorists are examining new electron coupling mechanisms that might explain how superconductivity can persist at such high temperatures. The astonishing pace of these developments is testament to the progress that can be made in the absence of constraints on scientific communication.

The only developed nation that seems to have been left out is the Soviet Union. No one sought to exclude them nor is their participation in these events prevented by any official decree of their government. On the contrary, they seem anxious to become a part of what is happening, but they are shackled by a research structure that was designed for secrecy – a system in which even access to copying machines and telephones was deliberately limited. Reform is under way, but such a system cannot be transformed overnight by Glasnost. Meanwhile, Soviet scientists, who are the equal of any in the world, are simply unable to respond to events moving at the pace of superconductivity research.

There is little doubt that, in the course of time, all mankind will benefit from the developments taking place in superconductivity. However, those with the vision and the energy to convert these research results into useful products will benefit the most. President Reagan recognized this in July 1987 when he personally addressed 2,000 businessmen, engineers and scientists gathered in Washington to discuss commercial applications of the new superconductors. His presence symbolized the government's determination to meet the challenge of the Japanese in the race to put this new technology to work.

Testimony before the US Senate Judiciary Committee Subcommittee on Technology and the Law, Washington, March 16, 1988

In his talk the President outlined an 11-point 'superconductivity initiative'. Portions of that initiative are embodied in the Superconductivity Competitiveness Act of 1988, which the President proposed in February. Title IV of the proposed legislation would require federal agencies to withhold commercially valuable scientific and technical information, generated in government-owned or -operated laboratories, from disclosure under the Freedom of Information Act.

This proposal is seriously misguided. There are at least eight reasons why a policy of withholding scientific information would make us still less competitive:

1 *It assumes a clear American advantage in research.* This reeks of chauvinism and, particularly in the case of superconductivity, ignores the international character of research. Ironically, shortly before the President forwarded his proposal to Congress, a group at the National Research Institute for Metals in Tsukuba, Japan, a government laboratory, announced a discovery which has led researchers all over the world to redirect their efforts. Most American researchers learned of it from the *New York Times* just three days after it was announced in Japan. Laboratories in this country and elsewhere have already confirmed the Japanese discovery. Clearly, we are in no position to erect a wall around this field. On the contrary, we are fortunate that the Japanese do not have a Superconductivity Competitiveness Act.

2 *It does not identify from whom information is to be withheld.* Government laboratories cannot exploit 'commercially valuable' information. Such information is generated only for transfer to others, but what others? Would it be withheld from foreign corporations with branches in the United States, or American corporations with foreign subsidiaries or foreign stockholders? Would it be withheld from foreign scientists conducting research at American universities, or university professors with foreign graduate students? The proposed legislation is silent on these critical questions.

3 *It would impede the flow of ALL scientific and technical information generated in government laboratories.* By requiring agencies to review research results for potential commercial application it will create a bureaucracy within a bureaucracy that will see its responsibility as restricting the flow of results. No mid-level bureaucrat was ever fired for being too cautious, and the responsibility for deciding what will be withheld will inevitably fall to persons with little experience in research or its commercial applications.

4 *It would isolate researchers at government laboratories from the rest of the scientific community.* In a rapidly moving field such as superconductivity, progress depends in large part on the informal exchange of ideas and results. Such informal channels are quickly severed if there is a perception that information from one side may be withheld.

5 *It would result in inferior science.* Nothing is more fundamental to scientific progress than the process of open encounter between scientists. We read the papers of our colleagues, respond to their challenges in open debate, visit their laboratories, argue with them in the halls of our institutions. In the absence of this sort of open scientific scrutiny and debate, erroneous theories or sterile lines of inquiry become chronic.

6 *It would invite retaliation by the international scientific community.* If other countries should take similar measures we would all be losers. The recent Japanese result I cited is an example of the sort of information we could lose.

7 *It would be ineffective in the long run.* The secrets of Nature cannot be withheld by passing laws. The scientists of other nations will in time learn them as ours do. If patentable information is involved, they will be free to secure those patents.

8 *It is, above all, misdirected.* It is a dangerous myth that America's problems in competitiveness result from some one-sided flow of technical secrets. President Reagan's statement of February 23 introducing the Superconductivity Competitiveness Act acknowledges that the United States has failed to convert laboratory breakthroughs into commercial applications. Let us then address that failure and not attempt to compensate by tinkering with the process that gives us the breakthroughs.

It is clear that, with respect to Title IV, the President has been poorly advised. Yet, the President's Superconductivity Initiative proposes a group of 'wise men' to advise him on superconductivity policy, and, indeed, the White House recruited the Advisory Group to the President on Commercial Applications of Superconductivity. The chairman of the group is Ralph Gomory, vice president for research at IBM, and its members include such distinguished scientists as Praveen Chaudhari of IBM, Kent Bowen of MIT, Theodore Geballe of Stanford and J Robert Schrieffer, director of the Institute for Theoretical Physics in Santa Barbara and a recipient of the Nobel Prize for his contributions to the theory of superconductivity. What was the advice of this high-powered group on the wisdom of Title IV? Incredibly, they were not consulted! Had they been, I believe they would have insisted on answers to the following questions:

– *Do the American companies engaged in superconductivity research want such protection against foreign exploiters of American ingenuity?* There is no evidence that the administration attempted to answer this question. I therefore conducted my own informal survey of research directors at AT&T, Bell Laboratories, General Motors, IBM and Westinghouse. These are companies that Title IV is presumably intended to help. Without exception, they forcefully expressed opposition to Title IV and felt it would do more harm than good.

– *Do the scientists at government laboratories favor restricting access to the information they generate?* I spoke with Alan Schrieshiem, who directs the superconductivity effort at Argonne National Laboratory. In his judgment, restrictions of the sort represented by Title IV would be both unworkable and misdirected.

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–What is the evidence that foreign competitors have gained an unfair advantage by the use of FOIA requests? Technology-licensing officials at federal laboratories are quoted in the *Chronicle of Higher Education* as saying FOIA is seldom invoked by foreigners to obtain access to technical information.

–Above all, what are the real obstacles to America's competitiveness? There are numerous thorny problems to be solved, but Title IV would solve none of them and would instead create new problems.

I have framed many of my remarks in terms specific to superconductivity research. This may have been a mistake. The only place in the Superconductivity Competitiveness Act that I am able to find the word 'superconductivity' is in the title. Is it possible that this is an attempt to exploit the excitement created by recent discoveries in this field to further a much broader agenda? Certainly, the scope of the proposed legislation is breathtaking. It covers all 'commercially valuable scientific and technical information' and in the accompanying analysis it says this clearly includes 'laboratory research that has potential for commercial application.' I have tried in vain to think of laboratory research that does not have that potential.

Not only is a policy of withholding scientific information unwise, it is also contrary to the stated policy of the United States government, as articulated both by Congress and the White House. In the Export Administration Amendments Act of 1985, for example, Congress asserts that:

'It is the policy of the United States to sustain a vigorous scientific enterprise. To do so requires protecting the ability of scientists and other scholars freely to communicate their research findings by means of publication, teaching, conferences and other forms of scholarly exchange.'

The White House, in a 1985 statement accompanying the announcement of National Security Decision Directive 189, *A National Policy on the Release of Scientific and Technical Information*, declared that:

'Our goal is to maintain the free and open exchange of unclassified research so necessary to a free society and an expanding economy.'

These are simple and eloquent statements of a sound policy.■

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